ENGINEERING NEWS-RECORD

Concrete makes a bargain garage p.38

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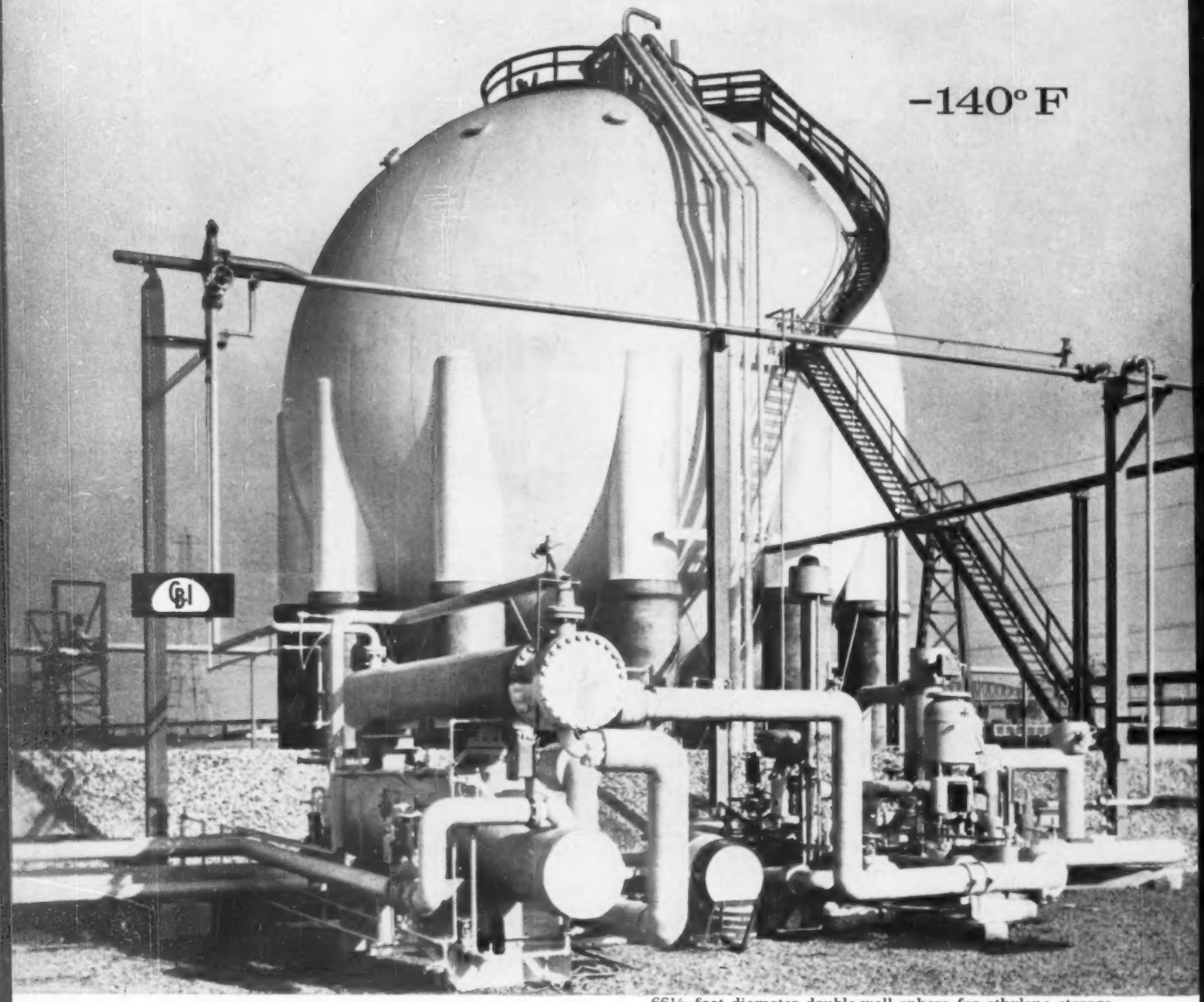

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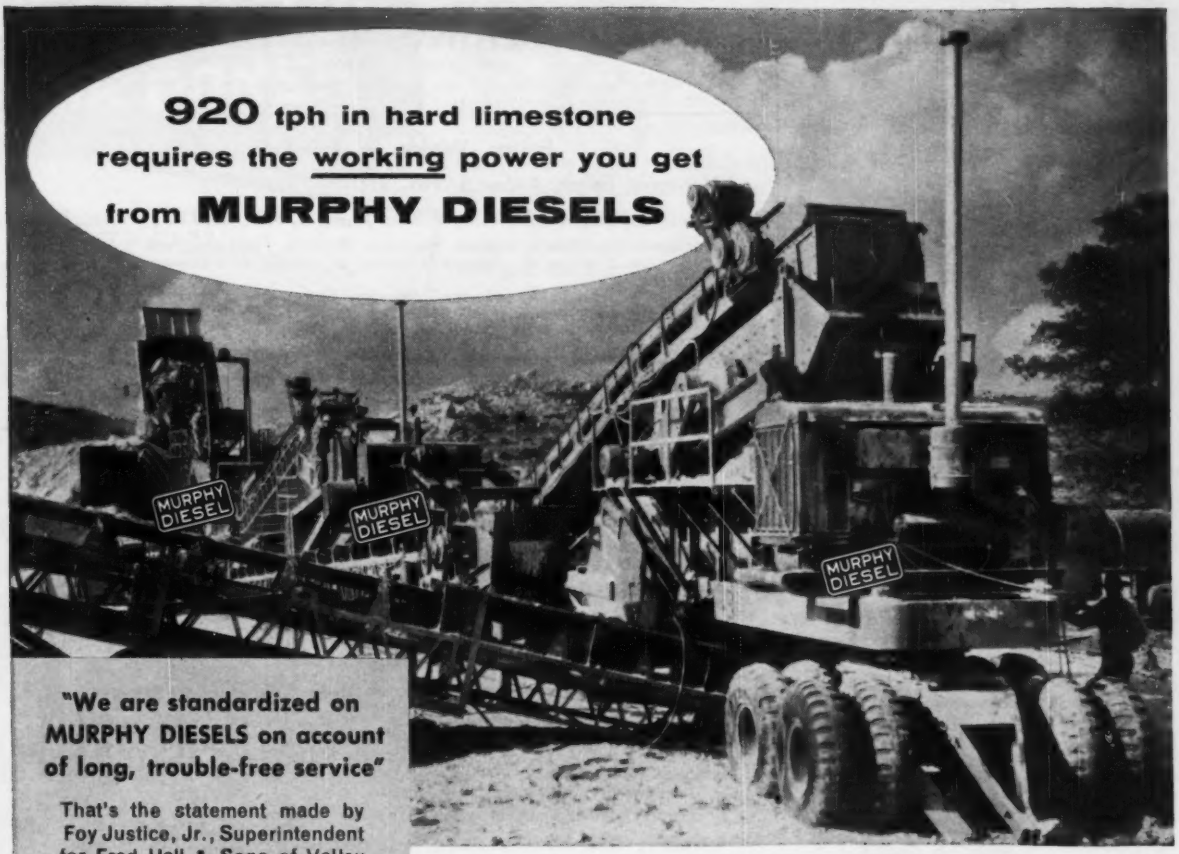

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That's the statement made by Foy Justice, Jr., Superintendent for Fred Hall & Sons of Valley Mills, Texas. And Mr. Justice has had plenty of experience with the performance of Murphy Diesels . . . they have 13 Murphys powering their Pioneer crushing plants and Northwest shovels to put more power into the job. On the job shown above, power for the crushing units is furnished by two 225 HP (continuous) Murphys, a 177 HP (continuous) Murphy, and a 150 KW Murphy Diesel Generator Set. They are producing crushed limestone for rebuilding U. S. 190 between Belton and Kileen, Texas.

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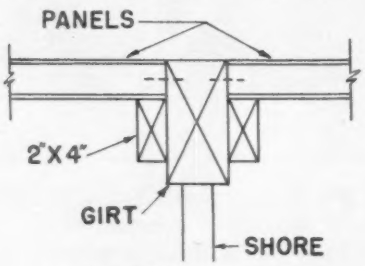

2 x 4's bolted to girt are removed, for ease of stripping.

When constructing apartments on the campus of Stanford University, Howard J. White, Inc. had one big problem . . . how to reduce slab-forming costs. Symons Steel-Ply Forms were the answer.

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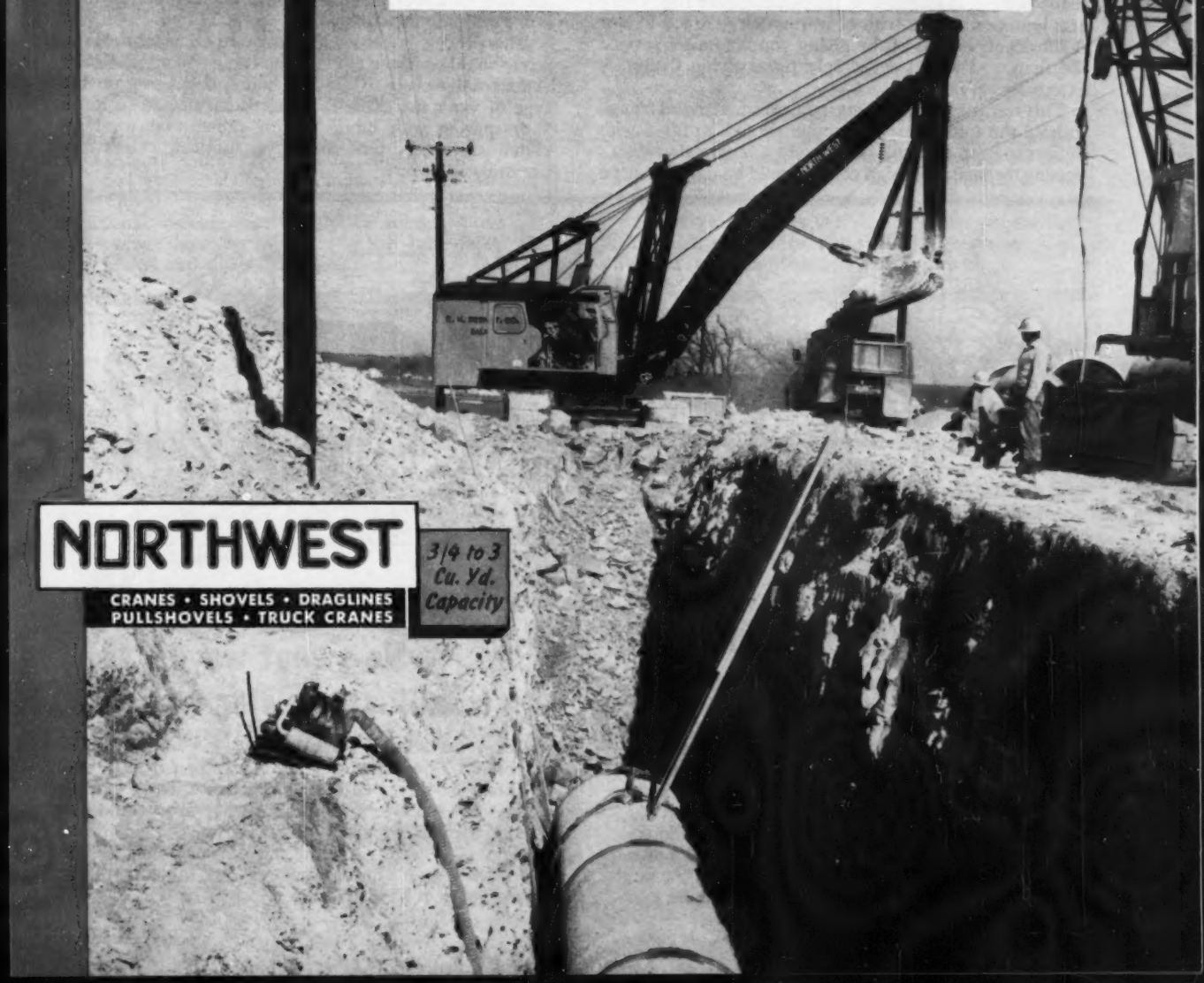

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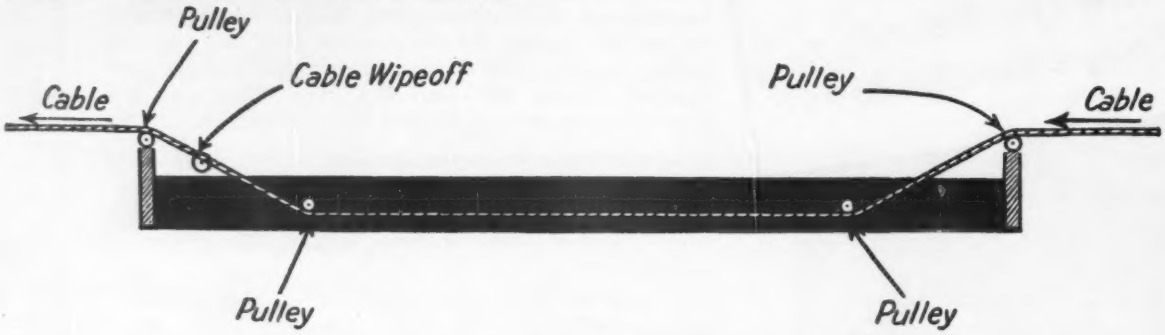
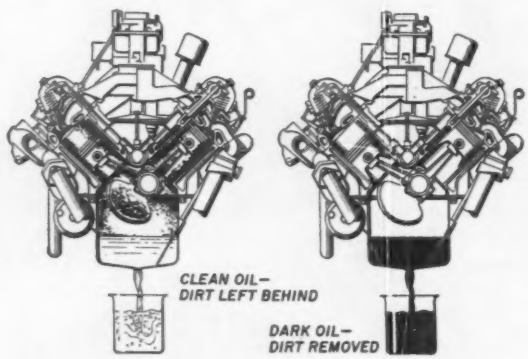


Warm bath restores wire rope

The best way to get lubricant inside a cable, where it's really needed, is to immerse the cable or wire rope every 500 hours or so in a bath of warmed-up Texaco Crater A lubricant. It pays off by giving you far longer service life than you would get simply by applying Crater A externally.

This warm-bath treatment requires a horizontal trough to hold the lubricant. The trough should be fitted with pulleys to keep the cable completely submerged while it's passing through. A burlap collar should be rigged to wipe off excess lubricant as the cable leaves the box. An immersion of about a minute will allow the lubricant to work well into the strands.

This process is *not* an alternative to other lubrication. You should continue to clean the cable and apply Crater A externally every 10 to 100 hours, depending on the type of work the cable is doing. Remember also to be very sparing with lubricants on cables that wind on clutch-equipped drums, and never lubricate cables that are dragged in dirt.



Dark engine oil . . . sign of a hard worker

Here's a motor-oil misconception that's still common enough to need discussion. Some folks think that the better an engine oil is, the more likely it is to come out as clean as it went in. The truth of the matter is just the other way around. A good detergent-dispersant oil holds onto dirt like an old friend. It keeps dust, soot and carbon in suspension, and carries it out of the engine when you drain the oil. Oil that looks clean when you drain it from the crankcase is a sign that these contaminants may still be inside the engine. Moral: oil that darkens in use is really doing its job.

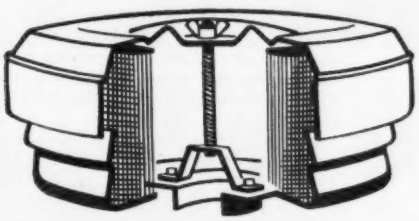
No-sweat way to adjust crawler treads

Crawler treads are easier to adjust if you dab a little Texaco Threadtex on the adjusting screws. The Threadtex stays put through months of service, keeps the screws free-turning and corrosive-proof. Another good use for Threadtex is on track bolts, when you're making up track. A little dab of Threadtex on the bolts will save a lot of time and work in taking down track after it has been in service.

to trim downtime

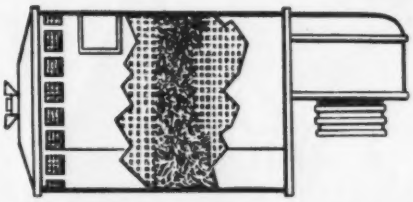
Key points on air filter maintenance

In a day's operation a typical engine inhales several thousand cubic feet of air, and on a construction project all that air is probably loaded with abrasive dirt and dust. Good air-filter maintenance is the only way to make sure your engine gets the air and *not* the dirt. Here are some maintenance tips that will keep your air filter working better through thick and thin.

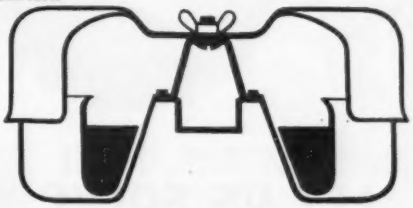


Dry type air cleaners (the ones with the fluted paper element) should simply be shaken or tapped lightly to remove dirt, and reinstalled. Never clean dry-type elements with kerosine or diesel fuel.

Additional precautions: empty centrifugal precleaners when the glass container is half full; don't remove the oil cup when the engine is running.



If your filter is the wire gauze type, and you want to re-use the element, wash the gauze in kerosine or diesel fuel, shake it dry *(don't* blow it with compressed air) and re-oil it with SAE 40 or SAE 50 oil to coat the element.



Oil-bath type air filters won't function properly if there's more than a half inch of sediment at the bottom of the oil reservoir. Check the sediment level by sticking a screw-driver down into the oil, and if you're anywhere near the half-inch level the bowl should be cleaned out and refilled. Also, inspect the filter every 5 to 50 hours to make sure the oil itself is at the right level. Every 500 hours the whole cleaner should be dismantled and cleaned, and refilled with new engine oil of the same grade used in the crankcase.

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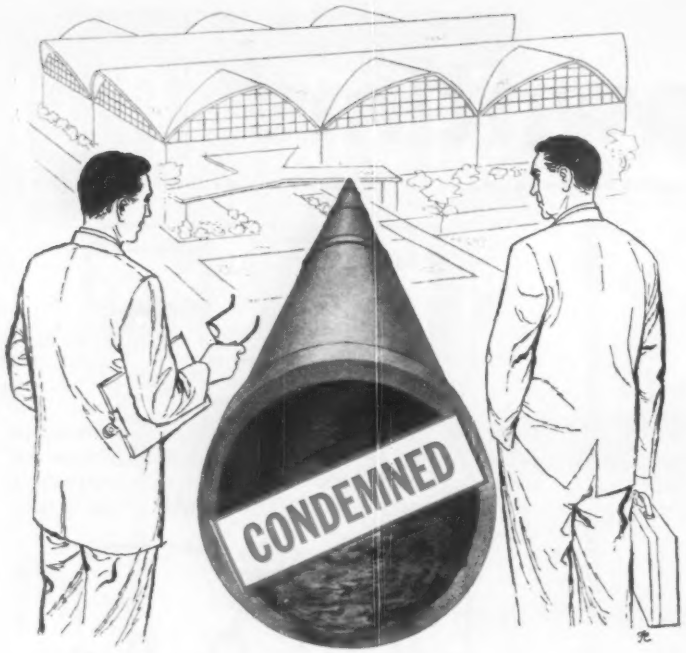

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Reader Comment

Dez Project in Iran

SIR—In your informative articles on the construction developments in Iran (ENR Mar. 9 and Mar. 16, 1961) you make the statement (March 9, p. 40) that the Dez project "is largely a product of Italian engineers." I don't think the history of the project supports this comment. (Editor's Note: Actually the quoted statement which appears on p. 40 of the March 9 issue, relates solely to the Dez Dam and not to the entire project, but Mr. Meyers' following comments provide additional significant information on the pre-eminent role of U. S. engineers on all phases of the work.)

As you reported, Electroconsult of Milan, Italy and the ISMES laboratory at Bergamo, Italy, were assigned the important task of designing the arch dam. This is a very significant contribution which has been carried out with great competence. But it is one single feat in a long chain of important technical problems which, excepting the dam design, were all products of American engineers.

I wish to mention just a few major links in this chain: First there was the discovery of the dam site. As recently as 1956 nothing was known of this site, and what general information was available was outright discouraging. Mr. Voorduin, Director of Engineering of the Development and Resources Corp., solved this problem by his pioneering search in the wilderness of the plateau. Then around this newly discovered site the basic concept of the project was developed and its benefits established by detailed planning.

Simultaneously, the initial site exploration was carried out, with P. P. Fox of Cleveland, Tenn., preparing the geological report.

In your articles you call attention to the difficulties which had to be solved in order to provide access to the different project features. The precipitous character and the great depth of the gorge similarly affected all other project features. Therefore the access road, the power facilities, the transmission plant, the spillways and the river diversion structures all called for many special design solutions. The designs of all these features are American products (by Development & Resources Corp. engineers), as are all the con-

(*Reader Comment continues p. 10*)

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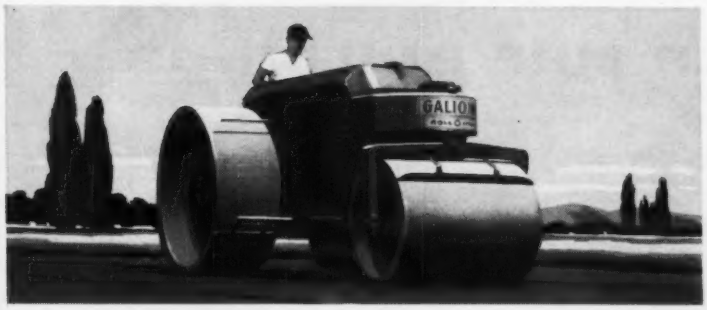

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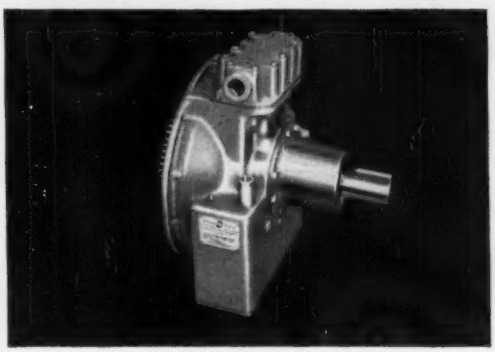

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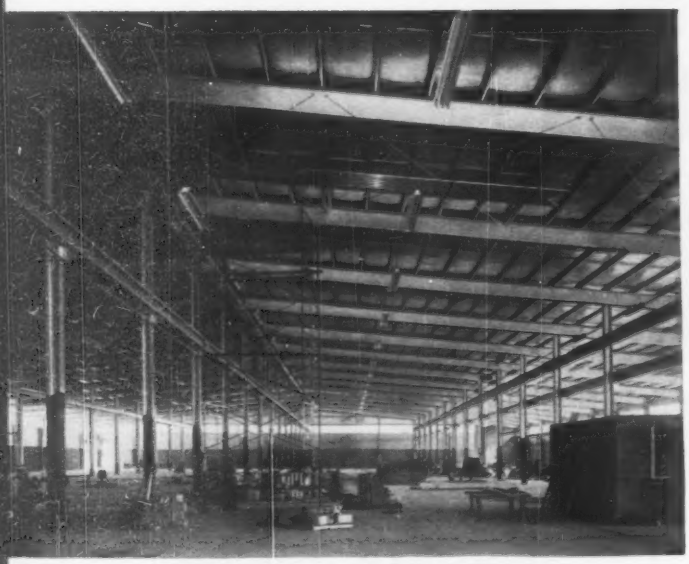

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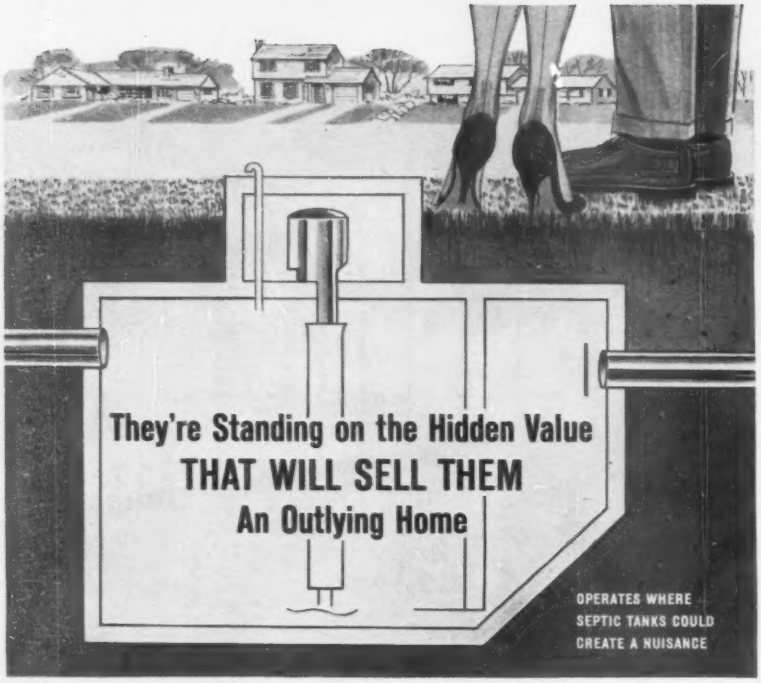

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struction specifications, the procurement of all major equipment and the preparation of the construction contracts.

ADOLF A. MEYER
Consulting Engineer
Annapolis, Md.

SIR—Waldo Bowman's articles on Iran (ENR Mar. 9, p. 36 and Mar. 16, p. 38) are very interesting indeed, and give a good idea of the tremendous development which is taking place in that country.

The picture painted by Mr. Bowman would not be complete, however, without the mention of another important Iran Plan Organization project, the $60-million Sefid Roud Dam.

Its construction is, in every way, a technical achievement of the same magnitude as that of the Karadj and Dez dams.

The Sefid Roud project was designed by a French consulting engineer, and is being built by a joint venture of French contractors, which includes Campenon Bernard of Paris. The project is in its final stage.

ROBERT SHAMA
Campenon Bernard
Caracas, Venezuela

Dome Corrections

SIR—Your article on the geodesic dome in St. Louis which received the 1961 R. S. Reynolds Award (ENR Apr. 6, p. 20) sparkles with error, misstatement and confusion:

The dome is not 175 ft in diameter; it is 177 ft according to our drawings.

The spherical surface is not "generated by the tension rods." (This is a curious statement in that none of the tension rods lies on a spherical surface.)

I am an architect, not the structural consultant as noted in the article.

The structural consultant to Synergetics, Inc. is Dr. M. E. Uyanik, of Raleigh, N. C., who is the engineer of record for the dome structure.

Synergetics, Inc. did indeed analyze, design and detail the dome and cover.

JAMES W. FITZGIBBON
President
Synergetics, Inc.
Raleigh, N. C.

Editor's Note: There must also have been some confusion involved in supplying the American Institute of Architects (which administers the Reynolds Award) with information on the dome. Except for the statement about the tension rods, which should have read "compression tubes," the article's errors came from the AIA's official announcement. It has been called to our attention that this announcement was also incomplete in merely listing Paul Londe as the mechanical engineer. The mechanical and electrical engineers were Fred S. Dubin Associates, with Mr. Londe participating as associate in charge of design.

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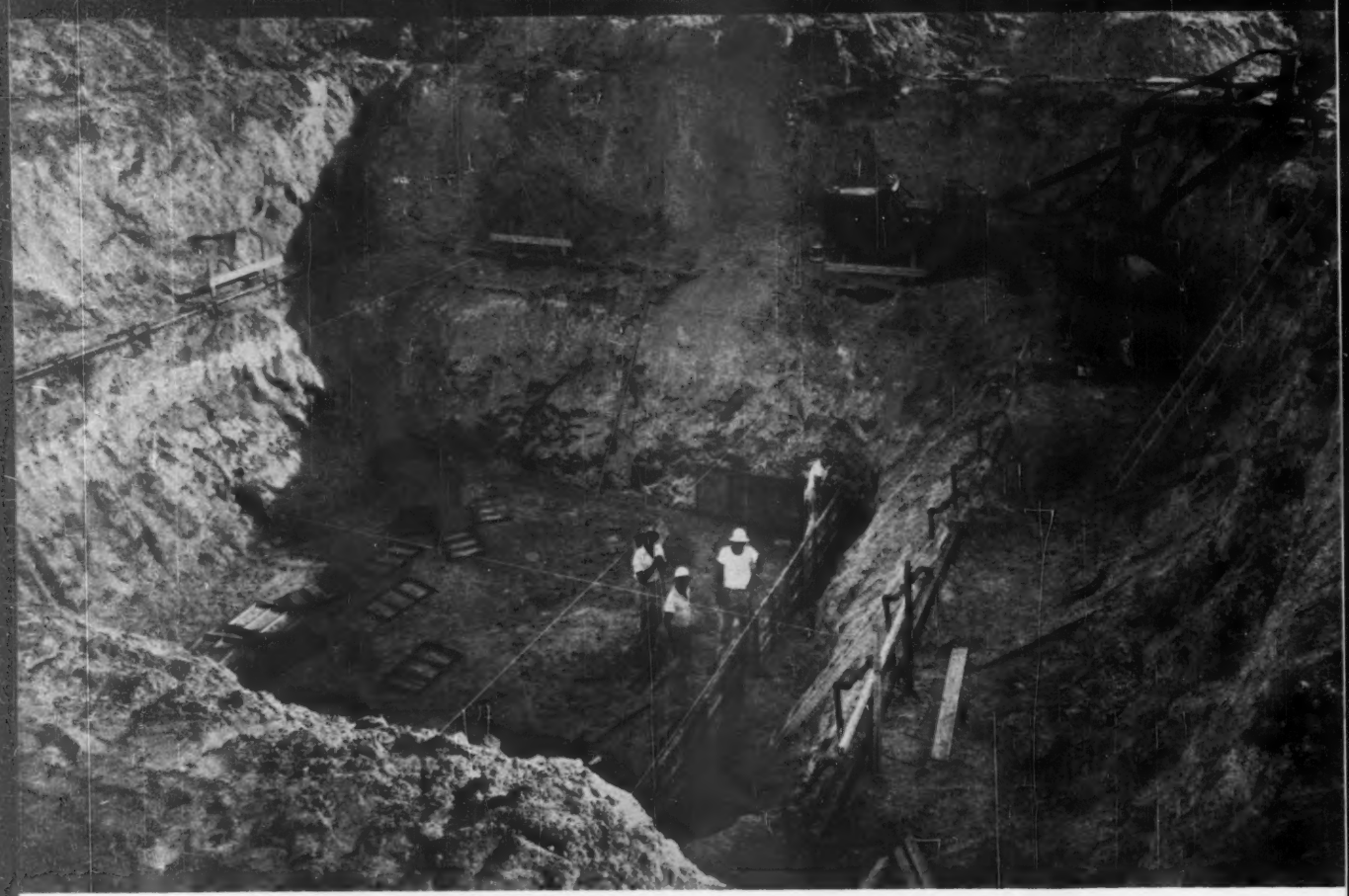

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CONTENTS

How Construction Bills Are Doing..... 17
DeLong Sounds Off on Texas Tower No. 4..... 18
Engineers Don't Know Enough..... 19
CEC Grows to Represent 1,600 Consulting Firms 19
Slides Plague Scenic Pacific Coast Highway.... 20
California's Men Who Watch the Lawmakers... 24
Blatnik Report Scores BPR..... 24

FEATURES

Belled Caissons Anchor Expressway Walls..... 28
Glen Canyon: Concrete on the Rocks..... 34
Precast Rigid Frame for a Bargain Garage..... 38

NEW PRODUCTS

Prefab Makes Debut at School..... 43

MEN AND JOBS

A Fighter for Free Enterprise..... 49

BUSINESS AND FINANCE

New and Old Ideas Cut School Costs..... 63
March Equipment Orders Up 2%..... 63
Prudential Job and Mass. Pike Bonds Try Again. 63

LABOR

UAW Denounces Construction Industry..... 65
Building Tradesmen Push Wage to $3.72..... 65
Who's Covered by the New Wage Bill?..... 66
Wage Gains Continue Strong..... 66
Union Sued for Damages in Hiring Hall Dispute 68

Reader Comment ... 6
Washington Observer 15
Materials Prices 55
Construction Reports. 56
Statistics, Indexes .. 61
Editorials 80

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THE CONSTRUCTION WEEK

OFF BASE—Kaiser Engineers finished the first quarter $3.4 million in the red. Most of the drag came from its missile base work, says President Edgar F. Kaiser. Last year, missile work cost Kaiser $1.7 million; and the company may lose another $2.5 million before its base work is completed early next year.

A STRIKE AT STRIKES—A Joint Appeals Board set up by the Associated General Contractors and seven building trades will make decisions that stick on labor disputes—if it gets support from the local level. There'll be no strikes while the disputes are in arbitration. The new board will not take up jurisdictional disputes. Local contractors and unions must volunteer to send other types of disputes to it.

GETTING LONGER—The states completed 173 miles of Interstate routes in the first quarter of 1961, says the Bureau of Public Roads. That makes 1,866 miles finished in the last 12 months. About 26% of the 41,000-mile system is open to traffic.

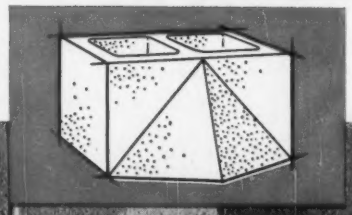
ENGINEERS' SALARIES UP—The National Society of Professional Engineers reports that the median salary of its members has climbed to $10,660. This is up from $10,000 in 1958. The top quarter make over $13,750. The top 10% earn over $19,680, the same as in 1958.

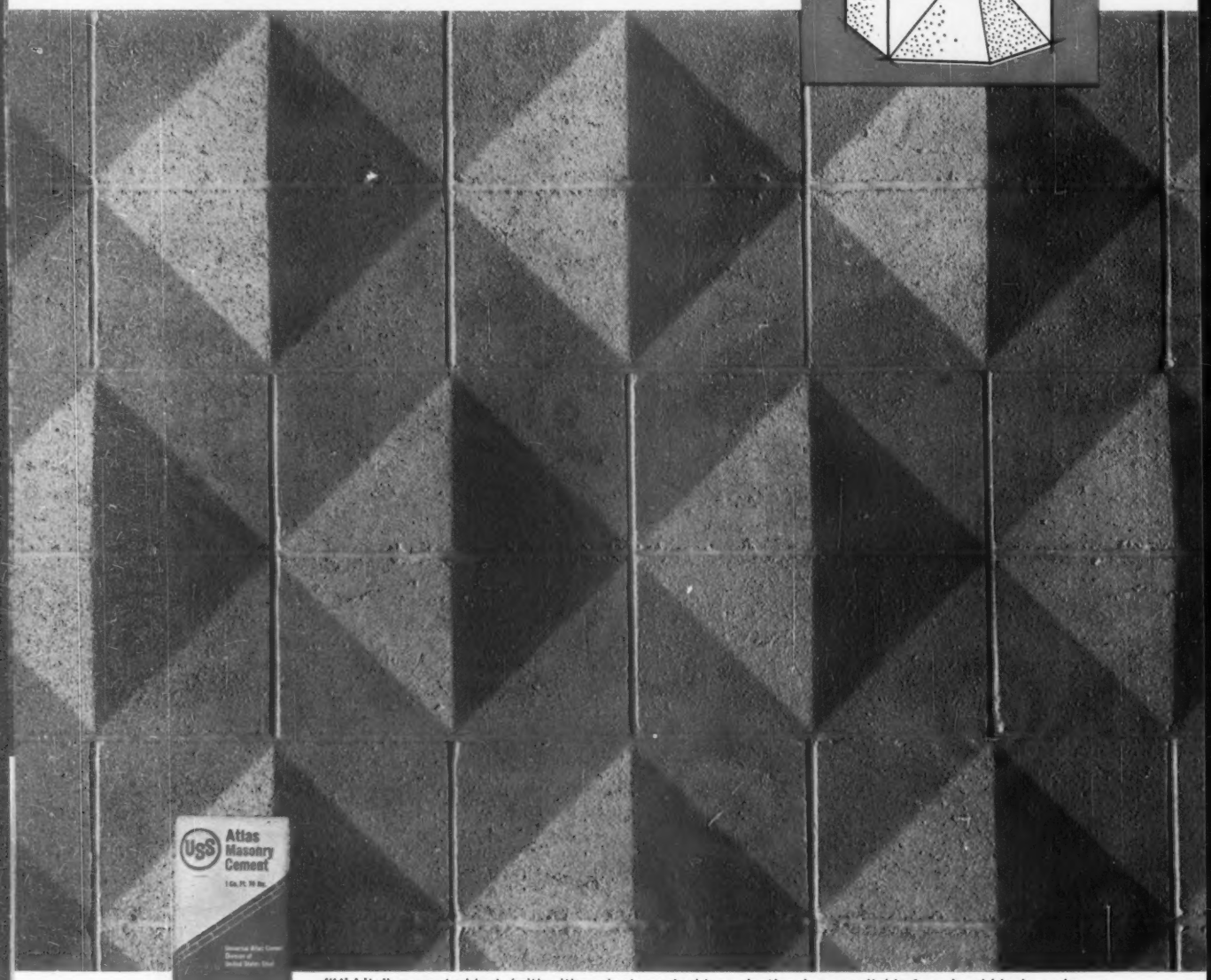
EASY STREET—A Dallas insurance company will pick up a $70,000 tab for concrete paving of all streets and driveways in the Hillview addition of Mesquite, Tex. Republic National Life Insurance Co. disclaims any philanthropic intent. A spokesman says the company holds mortgages on most of the houses in the addition and had trouble keeping owners in them after the streets went to pieces.

CLOSING THE GAP—Despite a heavy concentration of jungles, swamps, rocky barriers and unfriendly Indians, Central America's 500-mile Darien Gap has been declared passable by highway. On the advice of a subcommittee that has explored the area, the executive committee of the Pan-American Highway Congress will ask the U.S. and other countries for funds to finance engineering studies. Construction would complete a highway running from Alaska to most South American countries.

CONTRACTS FROM THE SPACEMEN—The seven astronauts intend to take a flyer in construction. They've decided to become owner-builders of a 350-unit apartment development near Washington, D. C., and to put up industrial buildings for lease near Landover, Md. Negotiations for financing are already under way. The astronauts start with a booster of $500,000 from LIFE MAGAZINE for their stories.

Great new things are shaping up in concrete block





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WASHINGTON OBSERVER

- **Another committee to check base disputes**
- **JFK may back aid to transportation**
- **AEC wants faster reactor progress**

● **A new government committee will check missile-base construction wages. That's the Administration's first step toward eliminating disputes at missile sites.** Labor Secretary Arthur J. Goldberg has named three arbitrators to hold hearings on wage determinations made by the Labor Department under Davis-Bacon Act rules. They are Thomas Holland, Lloyd Bailer and Peter Seitz.

Mr. Goldberg met Monday with Sen. John L. McClellan (D., Ark.), who has been investigating the matter, to tell him just what the new committee will do. The Labor Secretary emphasizes that the group will not resolve the craft unions' jurisdictional problems. But it may have to get into this area. In determining wages for construction work that is being performed on missile projects, it obviously must first decide what work fits the construction category.

President Kennedy asked Secretary Goldberg to meet with Senator McClellan "to see if we can get a responsible, consistent effort by labor and management in the field of production of our missile programs." Defense Secretary Robert S. McNamara has let it be known he intends to join Mr. Goldberg in the effort to halt wasteful practices, both by labor and management, in missile-base construction.

—

● **A decision is near on what role the federal government will play in helping to solve urban transportation problems.** Mr. Kennedy's advisors are split on whether to move in now or wait until the Administration has a firmer grip on the budget. The do-it-nowers are expected to win.

Best bet: Mr. Kennedy will endorse a bill by Sen. Harrison A. Williams (D., N. J.). It calls for a revolving fund of $325 million for federal loans and grants for the improvement of mass transportation systems, plus a $75-million matching grant program for research, planning and demonstration projects.

—

● **The Atomic Energy Commission is considering a new approach to the problem of stimulating construction of nuclear reactors.** AEC Chairman Glenn T. Seaborg apparently is convinced that the "partnership" program of the Eisenhower Administration will not achieve economic atomic power by the stated goal of 1968.

Mr. Seaborg says the switch may involve federal construction and operation of prototype plants needed to reach the goal. This would not be proposed officially, however, until a year hence, when Congress considers AEC's budget for fiscal 1963. The fiscal 1962 budget, now under consideration, involves no such construction funds.

Mr. Seaborg says the Commission also is considering incentives that would be designed to spur private construction of reactors. These may include such things as federal construction grants, operating subsidies, fast tax write-offs, financing of long transmission lines, and lower prices and charges for nuclear materials.

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How Construction Bills Are Doing

President Kennedy, beleaguered by the setback in Cuba and other crises abroad, can take heart this week in the progress of his legislative program through Congress.

As if rallying behind a discouraged President, Congress in two weeks has passed depressed areas and minimum wage bills that give the President almost everything he asked for. The House with unprecedented speed has whipped through a $600-million aid program for Latin America, new taxes to finance the highway program, and a doubling of the federal grant program for sewage treatment works.

Progress is also encouraging on the Administration's housing and college construction programs.

Congressmen returning from spring vacation in early April reported widespread approval of President Kennedy's grasp of the problems and of his personal style, but they found an equally uniform lack of enthusiasm for his legislative program.

Then came Cuba. Although the unsuccessful invasion tarnished the Kennedy image of superb competence, it has apparently helped to get his legislative program moving.

But more important, the White House has been learning fast where the trouble spots lie in this Congress and what must be done to get the bills through. The Administration had tended earlier this year to favor the Senate with its attentions, and neglect the House—until the President's minimum wage bill lost by one vote in the House. This brought home to the stunned legislative liaison team where the Administration's troubles in this Congress lie. White House contacts with House members were stepped up promptly. Lobbyists from labor unions and other organizations supporting the Kennedy program were told to concentrate their fire on House Republicans—and let the Administration worry about the Democrats. As a result, the minimum wage bill was "saved" in the Senate-House conference and passed the House the second time around by a margin of 34 votes.

The most striking success has been the ability of the Democrats to pick up 25 to 40 votes from the liberal Republicans on crucial issues. Early in the session, 22 Republicans deserted their own leadership to vote for a measure curbing the power of the House Rules

Minimum Wage: Raise minimum wage to $1.25 in two stages, extend coverage to 3.6 million workers, including 1 million construction workers (see p. 66).
Status: Passed by Congress and signed into law.

Military Authorization: Authorizes between $800 million and $900 million for military construction in fiscal '62, emphasizing missile bases.
Status: House passed $808 million, Senate committee authorized $879 million.
Outlook: Compromise between House and Senate bills is certain.

Interstate Highways: No change in schedule, continue four-cent gas tax and raise truck taxes to finance $9.8 billion more in highway construction.
Status: Passed House, clear sailing expected in Senate.
Outlook: Certain.

Housing Program: $3.2-billion housing program including increased urban renewal, more public housing, 40-year, no-down-payment loans.
Status: Passed by Senate subcommittee, House hearings under way.
Outlook: Favorable.

School Construction: $2.3-billion grant program for public school construction and teachers' salaries.
Status: Passed by Senate subcommittee, faces maneuvering in the House.
Outlook: Uncertain.

College construction: $180 million a year grants for construction of college classrooms, $120 million in loans for five years.
Status: Passed by House subcommittee.
Outlook: Favorable.

Depressed Areas: $451-million federal grant-loan program to help depressed areas attract industry.
Status: Passed by Congress and signed into law.

Urban Grants: $325 million for loans and grants to cities for improving urban transportation facilities.
Status: Senate hearings under way.
Outlook: Uncertain. Administration undecided.

Urban Affairs Cabinet Post: Create a Department of Urban Affairs and Housing.
Status: No hearings yet.
Outlook: Uncertain.

Situs Picketing: Permit uions to picket entire construction site in dispute with single contractor on project.
Status: Passed by House subcommittee.
Outlook: Chances negligible.

Tax Revision: Tax credits to stimulate plant investment with offsetting revenue measures such as withholding on dividends, tighter expense accounts.
Status: House hearings under way.
Outlook: Poor.

Retirement Tax Credits: Tax credits to self-employed for money spent on retirement plans.
Status: Passed House Ways and Means Committee.
Outlook: Unfavorable.

College Housing Loans: Increase $1.6-billion revolving fund for college housing loans to $2.8 billion over six years.
Status: Approved by Senate subcommittee, House hearings under way.
Outlook: Favorable.

Sewage Treatment: Double the current $50-million annual grants for construction of sewage treatment plants.
Status: Passed House.
Outlook: Favorable.

Airport Construction: $75 million annually for five years in aid to airports, 50-50 matching funds for runways.
Status: Subcommittee hearings under way in House.
Outlook: Favorable.

Frying Pan-Arkansas Project: $170-million water and power project diverting water from Colorado to Arkansas River through six-mile tunnel.
Status: Hearings scheduled.
Outlook: Uncertain.

Burns Creek Dam: $45-million Burns Creek Dam and Reservoir on Snake River.
Status: Hearings in progress.
Outlook: Uncertain. Administration approves but opposition is strong.

Committee to block the Administration's program. Thirty-three swung over to support the final minimum wage bill, and 41 sided with the Democrats on depressed areas legislation.

This crack in the GOP-Southern Democrat conservative coalition had not been expected after the last election, when conservative Republicans took more than 20 seats away from generally liberal Democrats.

But the big-city Republicans, who last year often supported the House minority leadership on substitute bills whipped up for almost every Democratic proposal, have not done so this year. With national leadership of the party uncertain, these Republican congressmen are figuring they will have to go to the voters next year on their own voting records more than on a party label.

There is also great dissatisfaction among this group with the image being presented by the Republican congressional leadership—Sen. Everett Dirksen (Ill.) and Rep. Charles Halleck (Ind.) The "Ev and Charlie show"—the leaders' weekly press conference—has become the butt of jokes, and the liberal GOP group has tried to disassociate itself.

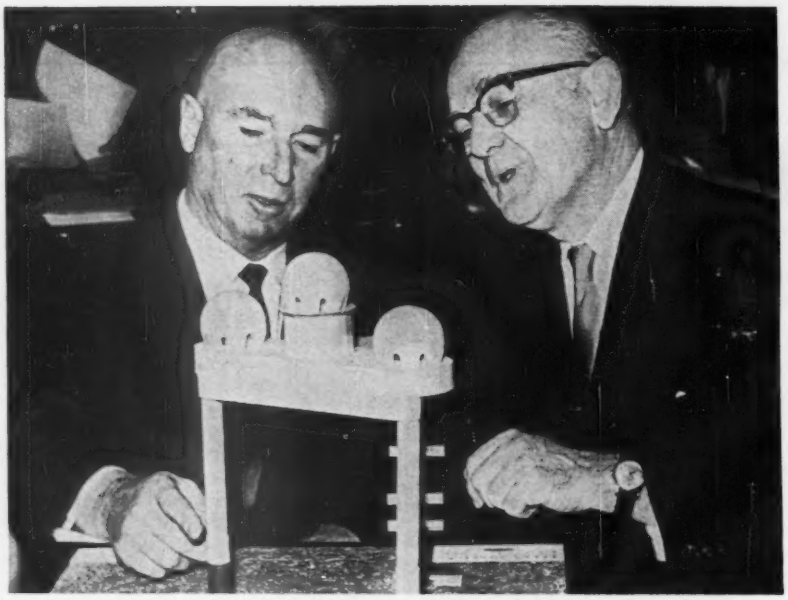
Still, the toughest tests, like the school construction bill, are yet to come.

Democratic leaders claim that the chances for passage of a school construction bill are improving every week. Rep. Adam Clayton Powell (D., N. Y.), the new chairman of the House Education and Labor Committee has paved the way for action by announcing that he will not attach an amendment denying funds to segregated schools.

The Administration's program to stimulate plant investment through tax credits may be shot down from all sides. Labor unions oppose the whole tax package as a tax break for business with nothing for the "little man." Business and industry are divided on the tax credit plan (many would prefer faster depreciation write-offs) and united against the crack-down on expense-account spending and dividend withholding.

The financial crisis that threatened to force a stretchout or cutback in the multi-billion-dollar federal highway program has faded. The House overwhelmingly approved a plan that will provide an extra $9.8 billion over the next 11 years to keep construction on schedule. The Senate is expected to follow suit within a month.

The new revenue will make possible completion of the $41-billion, 41,000-mile Interstate highway program by 1972 and a gradual increase in spending on primary, secondary and urban federal-aid roads from the present $925 million annually to $1 billion in 1968.



L. B. DeLong (left) would have built the Texas tower this way

DeLong Sounds Off on Texas

Senate investigators of the tragic offshore radar stations collapse in January heard last week from a man whose name is almost synonymous with Texas towers.

Leon B. DeLong told the Preparedness Subcommittee of the Senate Armed Services Committee that he would have designed and built the ill-fated Texas Tower No. 4 differently. His DeLong Corp. has put up half a hundred offshore towers in waters as deep at 210 ft during the past 20 years.

He would like to have built Texas Tower No. 4, too. He bid on it, in fact, in a joint venture with Raymond International. But they based their bid on an alternate design and method of construction. And they bid too high.

Mr. DeLong testified in response to a subpoena as the committee tried to establish whether design or construction slip-ups contributed to the eventual failure of the structure. And in his testimony he differed sharply with Capt. John J. Albers (CEC) USN who had testified the day before. Captain Albers was contract officer during design and the taking of bids but was not responsible during construction.

Captain Albers agreed with Mr. DeLong that the eventual collapse was traceable to breaks in two column connections of braces during construction (ENR Feb. 2, p. 23). And he conceded that something should have been done to remedy the defects. But he called the design and construction basically sound, called the collapse "more an act of God than of man."

Both men also made clear that they rate Moran, Proctor, Meuser & Rutledge, consultants on the tower with Anderson-Nichols & Co., high among the world's experts on marine structures.

But Mr. DeLong said he wishes he could have got them and the Navy's Bureau of Yards and Docks (who built the tower for the Air Force) to strengthen their design and change their construction method.

Ironically, the DeLong man who carried the fight for changes in Texas Tower No. 4 was unable to appear at the committee hearings. He was Mr. DeLong's chief engineer, George E. Suderow. Mr. Suderow died April 29.

In restating his firm's objections to the chosen design last week, Mr. DeLong criticized the pinned connections it had below water level. He insisted, as he said Mr. Suderow had insisted, that the structure should have been fully welded below water level to assure rigidity.

In recalling DeLong objections to the adopted erection methods, he said they exposed tower members to unpredictable stresses and hazards that could have been avoided by following tested techniques such as those his firm has been using since 1949.

Major hazards were present at two stages of the erection, he claimed. The first occurred in the method (never used before or since) of floating the three-legged substructure assembly in horizontal position to the site and there upending it to stand in vertical

. . . not this way.

Tower No. 4

position on the ocean floor. Tilting the assembled structure imposed stresses that could not be calculated, the witness observed.

The DeLong scheme would have floated the assembly in vertical position, as DeLong has done on all its other towers, including Texas Tower No. 2, off Nantucket.

Further great danger of damage came when the 4,000-ton permanent platform of Texas Tower No. 4 floated into position between the legs to be jacked to its final elevation, 67 ft above the sea. Positioning and raising a close-fitting platform of this size and weight in the open ocean, before the three long legs had been embedded in the dense sand bottom, induced additional unknown stresses in the underwater framing, the witness said. It exposed the 12½-ft-dia tower legs to possible crimping by wave action on the heavy floating platform, said Mr. DeLong.

His plan had proposed using a temporary 400-ton working platform on the tower until its legs were permanently embedded in the ocean floor.

Testimony presented last week shed new light on the damage during construction, damage to which collapse of the hurricane-ravaged tower has been traced.

In the tower's fabrication ashore, the top tier of three tiers of K-bracing between the tower legs was left off so that the tower's permanent platform could be floated in and jacked up. This meant less bracing for the structure, and increased stresses as it was tipped up at sea, Mr. DeLong noted. It also caused the initial tower trouble. Here's how:

Diagonals of the upper tier of K-bracing were pin connected to each tower leg ashore and lashed against the legs for the tow to the site, 85 miles off New Jersey. It was a stormy five-day voyage and lashings loosened on two of the diagonal braces. Swinging free, they damaged their connections to the tower leg. Substitute connections had to be installed under water at the site, after the tower was standing erect.

Both major witnesses at last week's hearings—Mr. DeLong and Captain Albers—agreed that Texas Tower No. 4 could not have been restored to its original, designed strength at the site after the damage during towing had occurred. It would have had to go back to its home harbor for repair.

When it comes to planning cities . . .

Engineers Don't Know Enough

City planning demands experts with skills beyond those of the architect or engineer. That was the consensus of professional planners who got in their licks at last week's National Planning Conference of the American Society of Planning Officials in Denver, Colo.

Technical education and experience do not prepare architects and engineers for city planning, said Dennis O'Harrow, executive director of the society. Mr. O'Harrow is a graduate civil engineer. But to be a successful planner, he said, "you must be versed in economics, geography, sociology, political science, law and public administration, to say nothing of the skills of communication."

Many successful engineers and architects suddenly become interested in planning, he said. "But you don't design cities by designing the bricks and mortar. You design cities by politics, by municipal finance, by democracy, and by the handling of people.

"The engineer sees a road as the shortest distance between two points. The architect winds it around scenically—and in the meantime he knocks out 500 houses perhaps. Somewhere between those two someone has to amalgamate their views into a successful compromise. That's the planner's job.

"The conflict between the engineer and architect is not serious. It helps the planner to have their divergent views; it probably keeps him on the most practical course," admitted Mr. O'Harrow.

Architects and engineers make outstanding members of planning commissions because they can visualize problems and translate their vision to other commission members, according to Corwin R. Mocine, president of the American Institute of Planners. "But, like other professionals, they must subordinate their special interests to citizenship."

W. C. Dutton, Jr., credited engineers and architects with an advantage in contributing original leadership, since they see what needs to be done. "Differences of opinion among engineers, architects and planners are not very great. Most professionals recognize the difference in these fields. Some conflicts have been a matter of semantics," said Mr. Dutton.

To rebuild and modernize our cities we must "break through the barriers of over-specialization," warned Sen. Harrison A. Williams (D., N. J.) a featured speaker. Senator Williams blamed some ailments of the exploding metropolis on the narrow outlook of "urban specialists" and to the "Balkanization" of federal-aid programs.

According to Senator Williams, civic groups or specialists concerned with rejuvenating declining downtown business districts may be totally oblivious of such related problems as improving mass transit, providing open space, and purifying polluted air. On the federal level, "we hand out money to the urban areas with a dozen different federal hands, and most of the time one doesn't know what the others are doing," he said.

T. P. Kennedy of Nashville, Tenn., was elected ASPO president; Francis S. McMichael of Pittsburgh was elected vice president; and David W. Graig, also of Pittsburgh, was elected a director. All are chairmen of regional planning commissions in their home communities.

CEC Grows to Represent 1,600 Consulting Firms

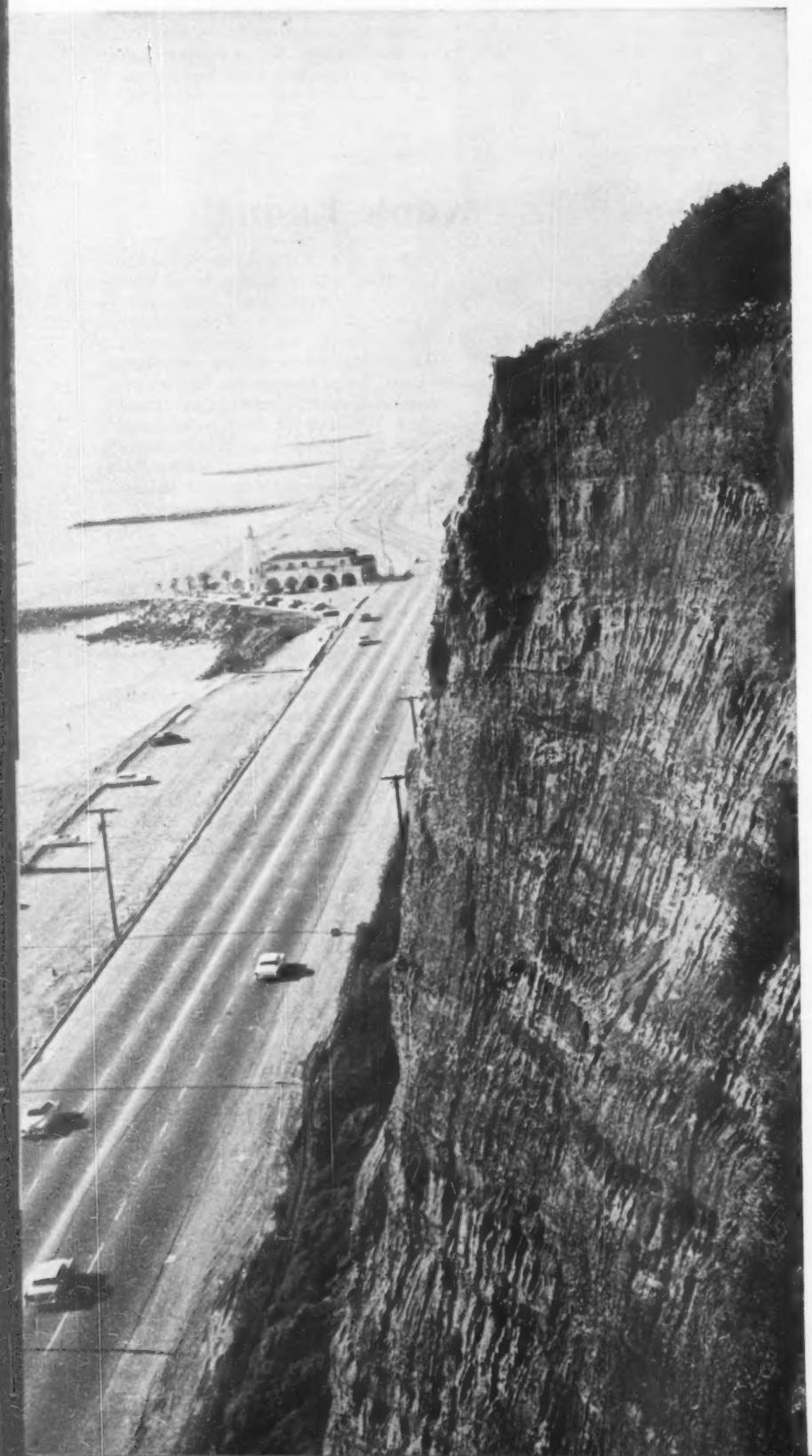
Consulting Engineers Council, meeting in Chicago last week, claimed that it now represents 33 state and regional associations of consulting engineers with a total membership of 1,600 members.

The five-year-old federation cited its growth and stressed its drive for greater recognition for its members—a stronger voice for consulting engineers.

Hueston Smith, outgoing president, warned members of new competition to private practitioners from nonprofit foundations, as well as old competition from government agencies.

The council installed Harold King as its new president (see p. 49).

Slides Plague Scenic Pacific Coast



A 17-mile stretch of Southern California's Pacific Coast Highway is a scenic route often punctuated with towering bluffs on one side and the ocean on the other. But behind the beauty of these Pacific Palisades lurks the constant threat of landslides.

The problem is complex. It's mainly related to water control and removal of water. It includes land failures in inland areas and slow-moving earth masses as well as slides along the coast highway.

The solution is equally complex. It involves the City of Los Angeles, County of Los Angeles, City of Santa Monica, the state—and property owners. Until this spring various government officials have been working diligently—but independently—on an antidote to slides. But now they are getting together in a series of conferences designed to form a united front and speed action.

Two major plans of attack are shaping up:

• **Building an alternate freeway around the Pacific Palisades slide stretch.** The State Highway Division includes coast route improvement in its long-range plans, and studies have been under way for some time on relocation of the highway as a freeway on a new 12-mile alignment between Olympic Blvd in Santa Monica and Malibu Beach. Three plans have been suggested: widening existing beaches and moving the highway seaward a few hundred feet, building an inland freeway through Santa Monica and Pacific Palisades, and constructing a causeway on a breakwater a quarter or half mile out in Santa Monica Bay. In the last few weeks the causeway cause has won

Twelve slide areas are principal

Highway

strong support from both the City and County of Los Angeles.

• **Constructing remedial measures at 12 major trouble spots.** Engineers have found more than 100 landslide areas, and consider a dozen of them sufficiently dangerous to warrant protective measures. Plans call for eliminating water by drilling drains under the bluffs and preventing additional water from permeating the terrain by installing catch basins and surface drains. Berms would also be cut and earth transferred to the base of bluffs for the purpose of counterbalancing weight of the earth mass above.

Erosion and crumbling cliffs in Pacific Palisades is not a new problem. The general instability of coast bluffs between Santa Monica and Malibu has been recognized for many years—and the condition has existed for perhaps thousands of years.

Water seems to be the chief villain. Any prolonged or intense period of wet weather causes excessive groundwater to accumulate, thus lubricating soil particles and aggravating slide conditions.

Until fairly recently these periodic slides didn't seriously affect the public. That element entered the picture after the coast highway was widened into four lanes in 1932-33. Then residential development of mesa areas above the palisades progressed steadily. And not only were more homes involved, but the highway began to carry bumper-to-bumper traffic during rush hours. As new cracks appeared in bluffs, warning signs were posted and traffic diverted as close to the ocean as possible. At any time heavy rains could touch off a major slide.

The slides have caused only one death so far. But there have been many close calls. A few motorists have been trapped and rescued while many others have passed safely through danger zones only seconds before the earth tumbled down.

Past suggestions for alleviating slippage danger have called for terracing, for use of asphalt paving over rims to prevent saturation by rain, and for massive concrete retaining walls. These ideas were all abandoned for one reason or another.

A couple of spectacular slides have made the problem a matter to be solved as soon as possible:

• In February, 1956, 200,000 tons of earth crumpled over a 600-ft section of highway from bluffs between Temescal and Potrero canyons, in East Pacific Palisades. It blocked the road and kept it closed for a week. In August 1956 a slide in Santa Monica Palisades swept four women picknickers from a 175-ft bluff down halfway to the beach amid 20,000 tons of rock and dirt. (Miraculously, they weren't fatally injured.)

• In March, 1958, a major slide in East Pacific Palisades shut down the highway. Five days later, while cleanup work was still going on, a second slide rippled down, burying earthmoving machines and killing a state highway department employee.

Meanwhile, unstable areas were drawing attention of the experts. Geologists, for example, suggested that any future slides onto the highway should be left undisturbed to prevent triggering other slides. And McIntire, Quiros & McIntire was hired to make and furnish aerial photographic maps of the unstable regions.

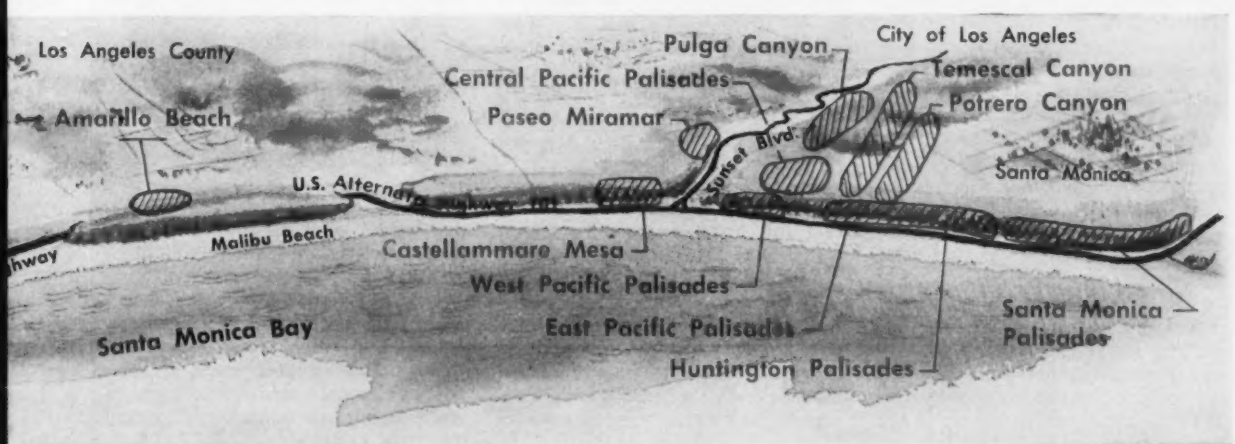
Late in 1957, Moran, Proctor, Mueser & Rutledge, New York consulting engineers, began a two-phase, $300,000 engineering study of the area. As part of their extensive explorations and observations, the consultants bored through unstable land masses and installed piezometers to observe pressure of groundwater and inclinometers to observe creeping or incipient movement of unstable ground. Borings and instrumentation were completed in December 1958. The consultants had used 118 holes, drilled to a maximum depth of 160 ft (and to a total depth of 8,320 ft). They had observed water pressures at 158 piezometers and had taken additional data on moisture at 35 wellpoints. They had installed 28 inclinometers.

In their final report, presented in 1959, the engineers indicated that "grave danger to life, limb and property" and "threat of a major disaster with consequent heavy loss of life" would continue until remedial work was done.

The engineers listed 12 primary problem points scattered along the coast highway in and west of Santa Monica. Of these, 10 are within the five-mile coastal stretch between Olympic Blvd in Santa Monica and Los Angeles city limits at Castellammare Mesa. The remaining two are in Los Angeles County's Malibu and Escondido beach areas, some distance to the west.

What are the hopes for a cure?

Costs of absolute control measures are out of proportion with property values. Proposed construction is not a cure but control measures likely to alleviate landslide threats. The consulting engineers say: "While it is certainly possible to flatten slopes to a point where they could become absolutely stable against any eventuality, such an operation would destroy much of the property it is desired to protect. It would be simple to call for such massive regrading and fills or large-scale drainage provisions in the landslide areas. But instead recommendations are



trouble spots along California coast between Santa Monica and Escondido Beach.

made only for control measures that are reasonable in magnitude, have a definite likelihood of alleviating the landslide threat, and which have fair justification by value of the properties to be protected."

What's the cost of combating slides?

The Division of Highways already has paid a price to keep the coast highway in safe condition. It spent $1.5 million in 1959 to realign a mile of the road around the major spring 1958 slides, another $341,000 for two shorter state road relocations. Los Angeles has signed up about $2 million for two box culverts in connection with a county flood control project. And Santa Monica has tapped some natural springs that loosen earth at bluff bases by constructing a drainage tunnel to divert water. It has also carried out $25,000 worth of sewer and storm drain repairs in Palisades Park to take storm water away from potential slide areas.

Now the cost of additional remedial measures for landslide control in the 12 pinpointed areas has been fixed at $5 million plus.

A joint report issued in 1960 by the State Department of Public Works and the State Department of Finance gives a financial analysis of various remedial measures proposed by consulting engineers. The state report recommends that local governments and property owners share the cost of control construction. This is the cost breakdown: $2.5 million assignable to private property owners; $2.6 million considered a public obligation, of which $2.3 million is in the City of Los Angeles, $189,400 in Santa Monica, and $102,000 in Los Angeles County.

But it remains to be seen where money for this work will come from.

One move early this year indicates the state legislature may tackle the problem of slides and failures—and how to finance control of them. The legislature might appropriate money for partial remedial measures, but it's doubtful that it will take any steps for correction of unstable land conditions on private property at the expense of taxpayers.

More likely, the legislature will ask local governments—and property owners—to share the cost. And while remedial recommendations proposed by the consultants have been corroborated in general by local officials, there are still some differences of opinion.

Santa Monica, for example, indicates a willingness to participate in financing, subject to availability of city funds—but is opposed to a cut berm along the top of its palisades. It says that would ruin Palisades Park, and is not a necessary step.

And at Huntington Palisades, cutting a berm and transfer of earth to the base of the bluffs could also face opposition. It would mean forcing residents to relocate, and the earth transfer would eliminate a portion of Will Rogers State Beach Park.

In the second plan of attack, state, county and municipal engineers are engaged in a high-speed, full-scale study of the coast highway relocation problem, with the Division of Highways in the role of coordinating agency.

Engineering data are being passed from one agency to another, and an attempt is being made to arrive at a mutual solution as soon as possible. But there will be many meetings and numerous negotiations before a plan that meets approval of all interested parties is decided upon.

Right now, the causeway—either a rock embankment or bridge—seems to be out in front of the other two proposals for an alternate routing. There are several reasons for this. One is that extension of the present highway seaward would probably get vigorous opposition from the State Parks and Recreation Commission. Another is that any inland freeway in the Santa Monica Mountains would require acquisition of a number of private homes. Too, a mountain route might cause more slides.

Actually, not much causeway action can be taken until later this year, when the Corps of Engineers complete studies of tidal sand movements and decides what height would be needed for such a project.

There's also the cost element to consider. Rough estimates place a causeway in the $60-million class, probably twice as much as the shoreline or inland routes. However, a causeway inducement is that a section of it could be solid fill construction so it could serve as a breakwater for a harbor or small boat marina.

Meanwhile—since the consultants' report—a new slide has already taken place, at West Escondido Beach, damaging two buildings.

Around the World . . .

• **Fallout shelter**—Bids are due May 26 for construction of a prototype community fallout shelter at Frankfort, Ky. The shelter will be under the existing building terrace of the state Capitol. Is will contain its own water, electric, ventilation and sanitation facilities.

• **Seville meets the sea**—The government of Spain has released $45 million for construction of a 42.5-mile navigational canal that will link Seville with the sea. The project, on drawing boards since 1953, will be part of a program of industrial development for Andalusia.

• **Volcanic steam**—Hawaiians are drilling for volcanic steam with an eye toward cheaper power for the city of Hilo and the island of Hawaii. They're exploring the area of the recent eruptions of Kilauea volcano.

• **New start**—San Francisco's Port Authority has appropriated $12,000 to employ John A. Blume & Associates, San Francisco consulting engineers, to assist authority engineers in revising plans for a 67-acre ship terminal. The job was set back when bids for work representing less than half of the total estimated cost of $30 million ranged well over the estimate from $17 million to $28 million (ENR Jan. 12, p. 24).

• **New design aid**—Look for publication this summer of a manual on orthotropic plate design. In this type of construction, braced steel plates act both as top flange of bridge girders and bridge deck. German engineer have used it for spans up to about 850 ft. The American Institute of Steel Construction is developing the orthotropic plate manual for U. S. engineers.

• **Lake terminal**—Work will start this month on Union Tank Car's $17-million bulk liquid storage terminal at Lake Calumet Harbor, on Chicago's South Side. The job, which will be done in two stages, involves dredging some 2 million cu yd of clay from the lake bottom, filling almost 177 acres of land, constructing bulkheads, docks and pipelines, erecting tanks to store about 200 million gallons of bulk liquids.

• **Corps to model estuary**—A $480,000 model study of the Columbia River estuary will begin this month at the Corps of Engineers' Waterways Experiment Station, Vicksburg, Miss. The 4½-year study is aimed at determining what should be done to maintain the 48-ft depth of the River's channel entrance. Jetty construction and rehabilitation hinge on results of the study.

When his fleet of four crawler dozers failed to maintain production behind eight draglines, this prominent sewer contractor tried a rubber-tired unit. Today:

One Michigan does work of six machines

The one Michigan Model 280 Tractor Dozer you see here is, *by itself*, handling all backfilling behind *eight* sewer-digging draglines. It has released *four* crawler dozers for other work, eliminated the need for a lowboy truck, and sidelined a compactor formerly used on the sandy trenchfill.

The job is a $2,000,000 network of sewer and water lines for the City of Bloomington, Minnesota. The contractor: Lametti & Sons, Inc, St. Paul.

"When we first tried the Michigan" recalls Bob Larson, veteran superintendent for Lametti, "we expected the 262 hp machine to produce only about as much as *one* of our 235 hp crawlers. But, particularly because the Michigan is so much faster on the return portion of each dozing cycle, it has *outproduced two of them*. And with its ability to travel quickly under its own power between locations it has had no trouble keeping *all backfilling* cleaned up behind *all eight of our draglines!*"

Travels 35 miles daily between jobs

Because of the wide area over which the draglines work—about four miles square—the 28 mph Michigan travels up to 35 miles daily between job locations . . . spends an average 20 minutes at each site dozing the 2700 lb/yd sand material up to 200 ft.

To do this job originally, two crawlers —both 235 hp—had to be lowboy-transported from location to location, and two smaller crawlers—70 and 100 hp—had to be kept at one station each. The Michigan, of course, doesn't have to wait for transportation, and it has kept production high continually.

Gets 100% compaction on normal dozing passes

There have been other benefits too! One is compaction. *In just normal dozing operation, the 57,770 lb Michigan Tractor Dozer has compacted the fill to original density.*

"When we used crawlers to backfill, we either had to load out about 10% of the material or use a vibratory compactor," Mr. Larson points out. "And with the compactor we were always worrying about broken sewer lines . . . something we don't fear from the Michigan's big (29.5-25) tires."

He continues, "Another reason we're pleased with the Michigan is the *excellent* availability it's given us from the beginning. It's a great machine for our kind of work!"

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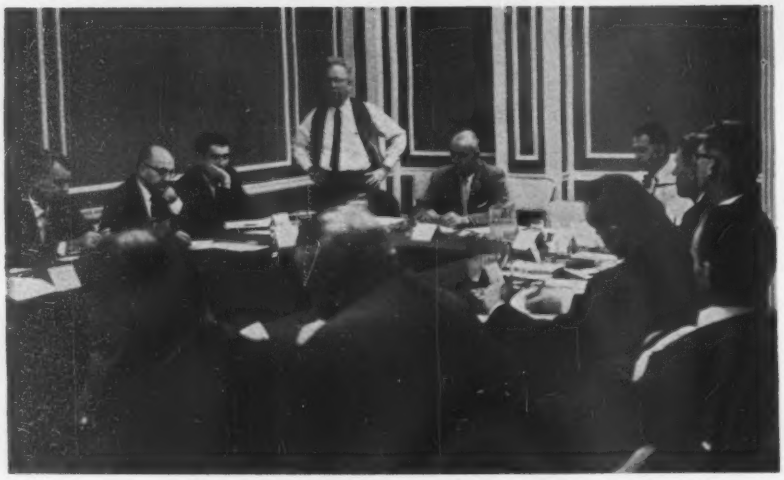

California's engineering organizations have their . . .

Men Who Watch the Lawmakers

With the California legislature now through more than four months of its biennial law-passing session, a watchdog committee of the state's engineers (pictured above) is confident that it has things well under control.

The California Legislative Council of Professional Engineers—an unusual, if not unique engineers' lobby—has checked out every bill of the more than 5,000 introduced that could possibly affect the status of the profession in California.

Of the bills submitted, the group has studied and discussed 120 of them. It took a definite stand on 35 and is watching progress of another 40. And with a very few bills so far reaching the floor of the legislature, these representatives of 14 engineering groups, state and national, have already achieved one major victory.

Normally, the group has key people appear before committee hearings in opposition or support of a measure, but once in a while a bill gets through committee and reaches the floor before full action can be taken. This happened this spring with AB 611—an effort to modify the registration law slightly to permit certain types of engineering work to be done by designers.

AB 611 was introduced at the behest of designers—a group of unlicensed practitioners in California who have filled a gap largely abdicated by architects in the home and small store design field, particularly subdivision house design. The bill slipped past committee in spite of opposition by the engineers.

Before a floor vote actually was taken, the engineers lobby swung into action. With a hard core group of about 25 engineers at work and nearly 300 involved from all parts of the state, legislators were contacted by telegram, letter, phone and in person. The architects were asked to assist, too. Result: The assembly defeated the measure by a 52 to 13 vote.

To screen all legislation and to watch out for the profession's interests in Sacramento, the Council has liaison at the capital. It employs a legislative advocate there.

This Legislative Council concerns itself primarily with professional registration—just as less formal groups in other states do. It traces its history back more than 30 years to an effort to safeguard the civil engineers' registration act in 1929. That effort did not develop a permanent organization—a new committee was formed for each legislative session for a while. But in 1939 a permanent organization did develop. It has grown since in membership and influence.

It is a public service effort, not solely self-serving. Legislators request and appreciate guidance provided through and by the Council. The Council sticks to its knitting, doesn't get into issues of no concern to the professional groups it represents. However, this does not prevent individuals or individual engineering organizations from lobbying on their special interests. The Council's legislative advocate will assist them, in fact.

For many years the mainstay of the organization was its secretary-treasurer, the late Pecos H. Callahan, who had been secretary of the California Board of Registration for Civil Engineers. When he died two years ago, Jack Y. Long, an Oakland consulting engineer, took the job. Current president is P. W. Helsley, a civil engineer from San Diego.

Leroy F. Greene, a Sacramento civil engineer, serves as legislative liaison committee chairman.

Blatnik Report

Committee has final say on Skelly Bypass, clearances

The Democratic majority of the Blatnik subcommittee sharply criticized the Bureau of Public Roads this week in reporting to the House on two of its inquiries into management of the Interstate highway program. The Republican minority, in caustic dissents, came to the Bureau's defense.

The investigations dealt with alleged fraud against the government in construction of the Skelly Bypass near Tulsa, Okla., and the fixing of vertical clearances prior to January, 1960, at a height too low for movement of the biggest missile age military equipment.

The majority charged that the federal government and State of Oklahoma were "defrauded to the tune of hundreds of thousands of dollars" in construction of the 13-mile Skelly Bypass. Specifications were ignored, substandard materials used, test reports falsified and charges double-billed, it said.

The majority took this position:

- The Bureau and state are equally to blame. BPR conducted only perfunctory minimum inspections on the Skelly job, relying too heavily on the honesty and integrity of state officials.
- BPR is charged by law not to hand out federal aid until it makes a finding that state highway departments are "suitably equipped and organized." It has the responsibility of enforcing this "suitability" particularly in construction and inspection phases of highway work.
- The tightened checking procedures it instituted in the wake of the subcommittee's hearings are commendable but their adequacy is questionable. There should be a re-evaluation of both state and federal inspection and audit procedures.

The minority countered that state employees, not BPR personnel, were "the real culprits" of the Skelly project.

In the vertical clearance controversy, the majority said investigation showed that a critical problem was "belatedly recognized, grossly mishandled, improvidently appraised and analyzed, and perversely solved, if indeed it has been solved."

BPR fixed a 14-ft height at the beginning of the highway program in 1956 without consultation with the Defense Department. Defense shortly began to entertain doubts, however, subsequently asked for 17-ft standard, but agreed after consultations with the Secretary of Commerce, BPR's boss, on 16 ft. The majority said it took 3½ years to fix this standard—a period of "incredible vacillation" during which 2,200 vertical clearances were built at 14-ft heights.

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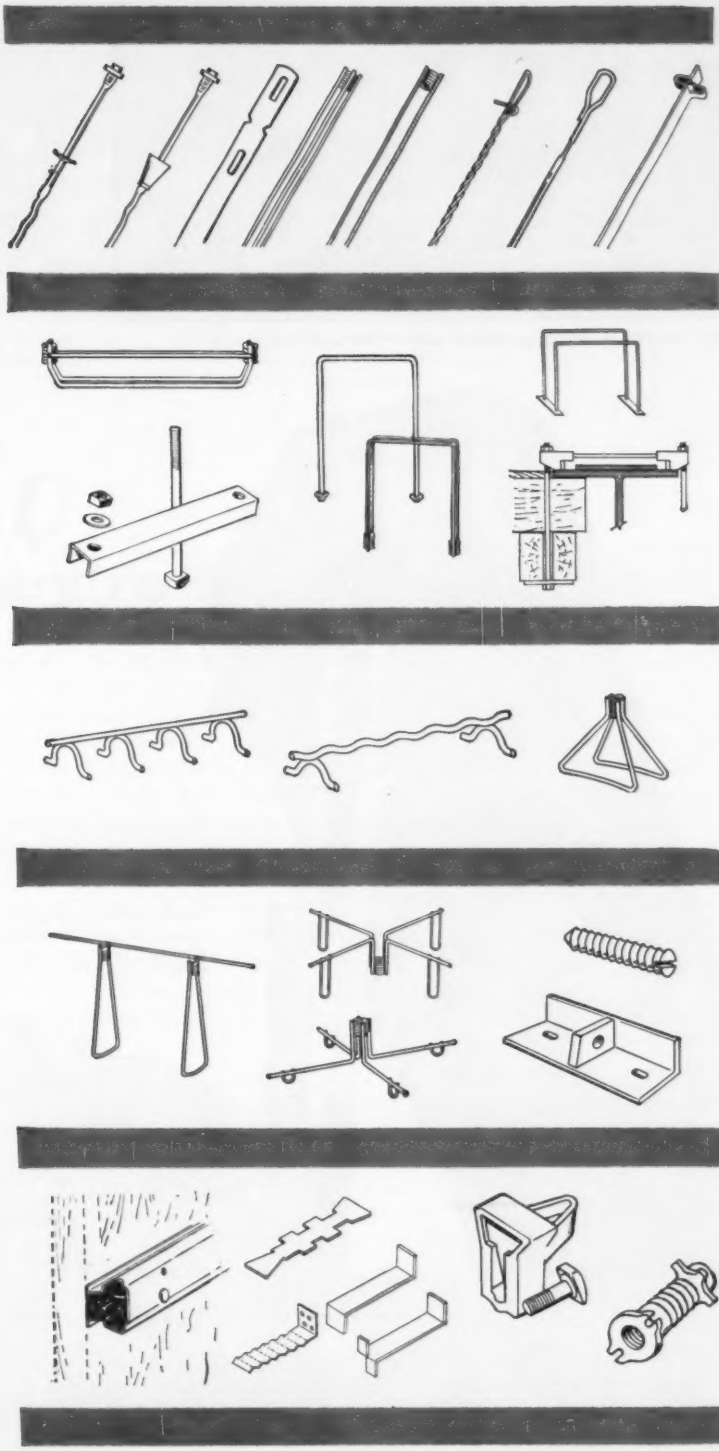

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Three-axle dump trailer hauled by Mack B Model delivers a load of pit sand on construction site at Smiths Creek, Mich. Mile-long run from sand pit to job is made in fastest legal time, thanks to Mack truck maneuverability.

Lumber load is transferred directly from rail car to trailer powered by B Model Mack for delivery to building supply yard of Foster Builders Supply, Port Huron, Mich.

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"Whether they're hauling loads of lumber at 32,000 lbs. GCW . . . 121,000-lb. GCW's in aggregate trains . . . or six-yard loads of ready-mix concrete . . . our Mack trucks have been outstanding performers. Even our 1925 Mack AB Model still handles its share of the workload."

Foster Builders Supply has learned over the years what more and more construction operators are finding out; that Balanced Design, Mack's practice of building far more of its vital components than any other heavy-duty truck maker, pays off in a matchless vehicle.

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The Brownie Corporation, owned by H. C. "Brownie" Foster, H. C. Foster, Jr., and Louis H. Foster, operates popular B Model Macks as aggregate hauling trains with a GCW of 121,000 lbs. and as dumpers shown below.

Belled Caissons Anchor Walls as

By N. C. Jones and G. O. Kerkhoff

Engineers of the Michigan State Highway Department will supervise installation of about 40,000 ft of reinforced concrete retaining walls anchored by 20-in.-dia, post-tensioned concrete caissons on an expressway project in Detroit.

The walls range in height from 20 to 28 ft, caisson spacing varies from a maximum of 18 ft to 11 ft 8 in. for the highest wall sections.

Final design of the walls was based upon the results of full-scale tensile tests of the caissons, which resulted in a design load of 150,000 lb for each caisson.

Each caisson has a 5-ft-dia bell at the bottom and is placed on a slope of 2 vertical to 1 horizontal. Top of each caisson is about 8 ft below the top of the wall; bottom is about 10 ft below the bottom of the wall footing.

The extensive use of retaining walls resulted from a decision to extend the John C. Lodge Expressway through the city of Detroit on the James Couzens Highway. The Lodge expressway is a six-lane, fully depressed facility with limited access.

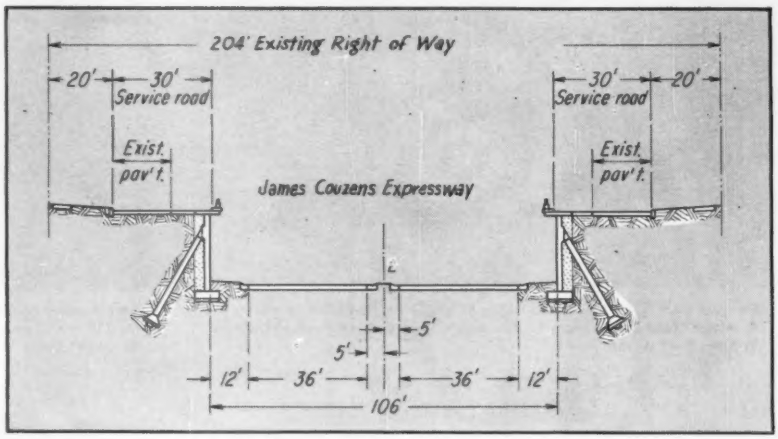
The Couzens highway is a surface street with a right-of-way width of 204 ft. The present highway comprises two 40-ft roadways separated by a median 84 ft wide. Outside edge of each roadway is 20 ft from the property line.

The James Couzens Highway will be converted into a fully depressed expressway in the center of the right-of-way, with a service road along each side. The expressway will have two 36-ft roadways with 12-ft shoulders and a 10-ft median. The service roads will utilize the existing pavement insofar as possible; each will be 30 ft wide.

In order to contain the expressway lanes within the existing right-of-way, designers decided to build retaining walls along the expressway for the full length of the project (about four miles). About 3 ft 6 in. of each service road will cantilever over the edge of the expressway.

Because of the great length of retaining wall involved, engineers undertook a comprehensive investigation to determine the most economical wall design. Soil in the area is primarily stiff to plastic clay of varying shear strength.

Mr. Jones, assistant engineer, supervised design of the walls for the Michigan State Highway Department. Supervision of field testing was by Mr. Kerkhoff, head of the soils section of the testing laboratory division.



NARROW RIGHT-OF-WAY forced use of retaining walls to improve James Couzens Highway in Detroit. Service roads cantilever over main roadway.

In some areas, the clay is overlaid with sand up to about 7 ft thick.

Before choosing the wall design, engineers prepared estimates of cost of several types of walls. Designs given serious consideration were:

1. A conventional reinforced concrete wall.

2. A precast, prestressed concrete sheet pile wall with an 8-in. concrete facing. The sheetpiles proposed were 1 ft 6 in. thick and 3 ft wide. Edges of the sheets were to be held in place by tongue-and-groove joints. A thrust pad was proposed on the inside face of the wall about 3 ft below the shoulder elevation of the expressway to insure stabilization of the wall against overturning.

3. A steel sheetpile wall anchored in the back with 12-in. bearing piles, driven on a batter and connected to a waler from the back side. It was proposed to face the wall with 8 in. of reinforced concrete.

4. The reinforced concrete wall anchored in the back with belled caissons.

Based on the maximum height of wall, engineers' estimates of cost for the four types of wall were 1. $305 per lin. ft, 2. $320, 3. $270 and 4. $257. Unit prices of the low contract bidder on the first section of the expressway, when applied to the quantities used in the preliminary estimate, gave a cost of $258 per lin ft for the caisson-supported wall (4).

Although wall types 3. and 4. were comparable in cost, the caisson-supported wall has several advantages over type 3. Drainage behind the wall is much more positive; the caisson anchor has a mechanical advantage in resisting tension that the battered bearing pile does not have; and the concrete wall is more readily adapted to cantilevering the edge of the service road over the expressway.

Before finally adopting the type 4 wall, it was decided to construct test caissons of this type as tension members. Test procedures and results are described on the next page.

The two vertical to one horizontal slope of the caissons was chosen to permit proper placing of the concrete in

Full-Scale

Engineers performed full-scale pullout tests on both straight-sided and belled drilled-in caissons to demonstrate their effectiveness as tie-backs for the retaining walls.

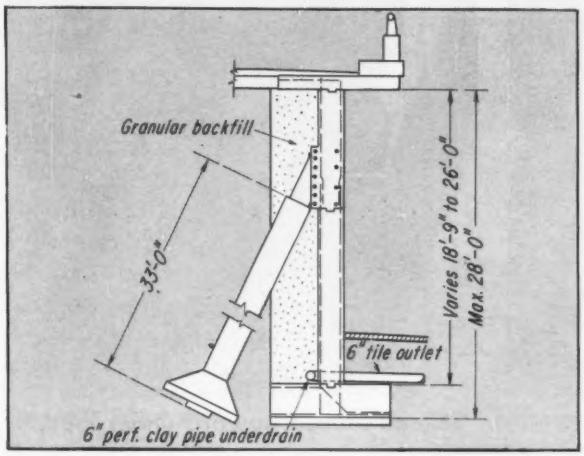
Results were used to determine the most economical length of caisson for the variable height of wall and soil conditions.

Soil engineers chose a test site in the median of the James Couzens Highway where subsurface conditions were considered average for the project.

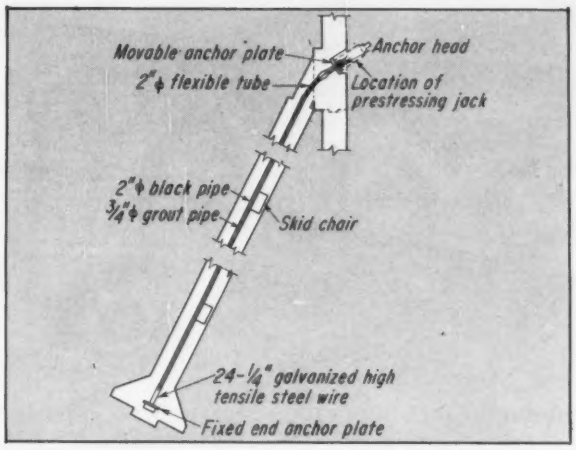
Workmen installed nine concrete caissons on a 1 on 2 batter, spaced 8 ft c-c. Four caissons were 4 ft in dia and about 11 ft long, extending into hard clay to provide bearing reaction. Five caissons were 20-in.-dia reinforced concrete shafts, ranging in length from about 15 to 37 ft; two of these were belled at the bottom of the shaft (5-ft-dia bells). Reinforcing comprised eight No. 11 longitudinal bars tied together with No. 4 hoops spaced at 2 ft.

• **Test set-up:** A yoke lifting device

Michigan Remodels an Expressway



TIE-BACK CAISSONS provide economical design of retaining walls. Project includes more than 40,000 ft of wall.



JACKS will post-tension caissons before overturning loads are applied to walls.

the shaft of the bell and at the same time hold the caisson reinforcement in place during construction.

While most of the soil in which the caissons will be embedded is believed to be clay, the possibility of encountering sand pockets that might cave in during construction of the caissons was considered. For that reason, caisson liners may be necessary in a few locations. Caisson liners will be removed as concrete is placed to assure contact between caisson and surrounding soil.

The caissons will be post tensioned to minimize deflection of the wall. Post tensioning will be done after the concrete has attained a strength of 2,400 psi and before placing any overturning load on the wall. Post tensioning permits substitution of an easily placed reinforcing unit for a heavy, unwieldy, conventional-type cage.

During construction of the service roads and retaining walls, traffic will be carried in one direction on a temporary road in the present median and in the other direction on one of the existing roadways. Traffic will then be routed over the completed service road and the temporary pavement in the median while the opposite service road and wall are being built.

When both service roads are completed, traffic will be carried over them while the expressway and the bridges over the expressway are built.

Pull-Out Tests Prove Caisson Design

was used to apply tensile load to each test caisson. Reaction beam was a 36-in., 194-lb WF beam reinforced with a 1-in. steel plate welded on the top flange, plus web stiffeners welded at each end and at the center of the beams. Load was applied to the caisson by a 200-ton hydraulic jack fitted with a pressure gage; both were calibrated to assure accuracy in applying load increments.

Engineers used a test procedure developed by Prof. W. S. Housel of the University of Michigan.

Technicians applied load in equal increments at equal time intervals of one hour until the maximum load was reached. The maximum load was maintained for one hour. The load then was decreased in steps equal to 25% of the maximum load at equal time intervals until all the load had been removed. Total rebound was recorded when deflection was less than 0.001 in. in 10 minutes.

Three dial gages were used to measure caisson movement. The gages were supported independently by a reference beam. Observers recorded dial readings immediately before and after the application or release of each load increment and at 10-minute intervals between load changes.

• **Test curves:** Soil engineers prepared three types of graphs from the test data for a particular caisson. Interpretation of the graphs permitted determination of the capacity of the caisson at the elastic limit and at the yield point.

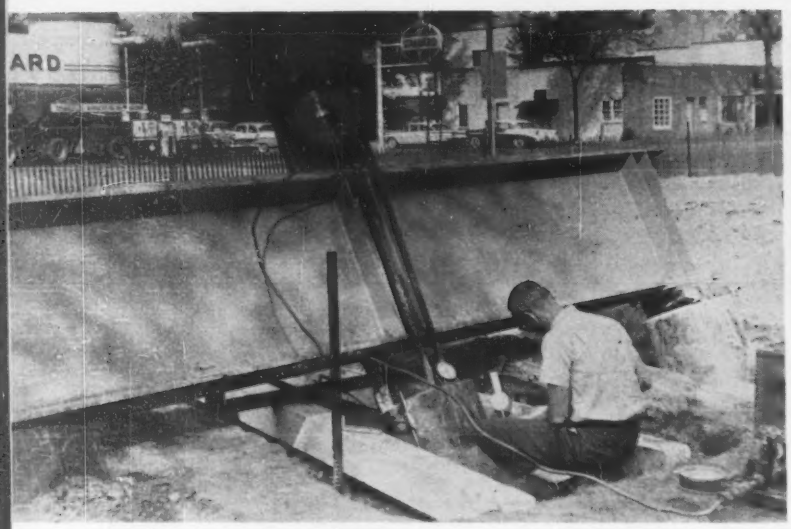
The three types of graphs are the load-movement, yield value and time-movement curves. A portion of the data for one caisson is shown in figures 1, 2 and 3.

Figure 1 is the load-movement curve for three cycles of loading (80, 150 and 150 tons total load). The method of determining the yield value for each cycle of loading is shown in figure 2. Figure 3 shows the time-movement relationship for the second cycle of loading.

Analysis showed that the caisson had the capacity to sustain the first cycle of loading (80 tons) within the elastic range of the soil. The three graphs show for the second cycle of loading that the elastic limit is between the initial and secondary yield values; at maximum load, progressive movement is impending. Results obtained during the third cycle of loading confirmed those of the second cycle and indicated that a yield value of 120 tons was within the elastic limit of the soil.

Initial yield value of the elongation of the shaft occurred at 80 tons; the secondary yield value (indicating movement of the soil around the bell) occurred at 140 tons (158 tons on a second caisson). Elongation of the caisson under 80-ton load was very nearly the same as the computed elongation of the longitudinal steel under the same load.

• **Subsurface exploration:** Subsurface information was obtained from preliminary structure borings, an earth resistivity survey and two special borings at the test site. Undisturbed samples and



Hydraulic jack applies load as engineer records movement.

Caisson moved upward under load.

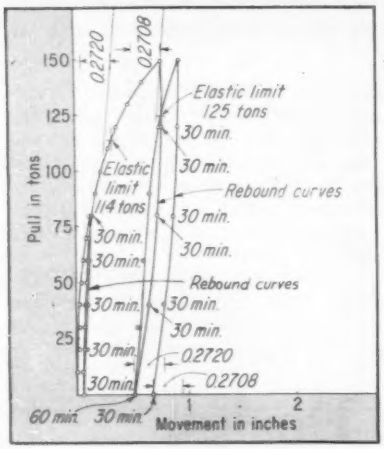


Figure 1. Load vs. movement.

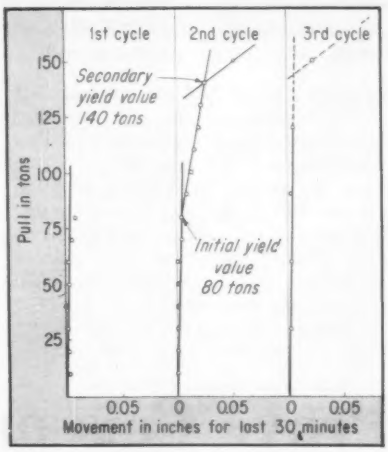


Figure 2. Fixing the yield.

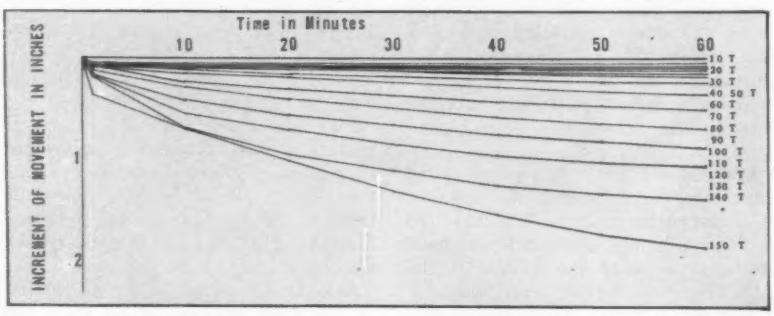


Figure 3. Typical time-movement curve (second cycle of loading).

penetration readings were obtained at intervals of 2½ ft in each boring.

Laboratory technicians performed ring shear and unconfined compression tests on the undisturbed samples.

The ring shear test is a measure of the static yield value of the shear stress greater than which the soil will undergo progressive deformation. The unconfined compression test supplements the ring shear test. Over several thousand parallel tests engineers found that shear values obtained from unconfined compression tests are very close to four times those obtained from ring shear. The correlation is marked for highly cohesive plastic clays.

Clay strata in which the test caissons were installed had shearing resistances of 1,500; 700 and 600 lb per sq ft, in sequence from top to bottom. Strata in which the bell sections were formed had shearing resistances of 700 and 600 lb per sq ft.

Shearing resistance in the surface sand strata was considered negligible, because of excessive caving at the top of each shaft and a water-bearing gravel seam at the sand-clay contact.

In addition to the special borings, University of Michigan penetration values and undisturbed shear samples were obtained during caisson removal.

• Caissons exposed: Immediately after

TABLE 1. Caisson Test Summary

	Caisson No.	Load Cycle	Total Pull (tons)	Total Movement (inches)	% Recovery	TEST RESULTS Elastic Limit (tons)	TEST RESULTS Yield Value (tons)	COMPUTED Resistance of Shaft (tons)	COMPUTED Resistance of Bell (tons)$_b$	Total Yield Value (tons)	REMARKS
Belled Caisson	3 (L-17.5')	1	80	.1220	48.5	...	...			...	No Yielding
		2	150	.7415	36.6	114	80* 140**	21	67	88(2) 115(1)	*Initial Yield Value ***Secondary Yield Value
		3	150	.4308	62.9	125	120-				Initial Yield Only
	8 (L-35.8')	1	80	.0970	36.6	...	...			...	No Yielding
		2	194	1.6495	32.1	152.5	80* 158**	37	57	94(2) 146(3)	*Initial Yield Value **Secondary Yield Value, Bell Failed
		3	194	1.4240	46.8(a)	151	120				(a) Interference with Reaction Beam
Straight Shaft Caisson	2 (L-16.2')	1	35	1.6850	7.2	19	20	22	None	22(4)	
	4 (L-23.5')	1	50	2.3380	3.0	30	30		None		
		2	40	1.0250	5.9	30	30	31		31	
	6 (L-36.2')	1	80	1.8000	6.4	47	56		None		
		2	80	1.4295	21.1	67	65	52		52	

(1) Periphery shear resistance of projection of Bell.
(2) Plastic movement of soil around Bell plus shaft shear resistance.
(3) Sum of shaft shear resistance plus strength of resteel at ultimate tensile strength.
(4) Test made 24 hours after caisson was moved into the ground about 4½ inches during a reaction loading.

Caissons after test.

completion of the field tests, workmen excavated to expose the caissons. The caissons showed generally good contact between the shafts and the soil.

One belled caisson (No. 3) was found to be undamaged at the end of the test. The other (No. 8) showed separation yielding at the juncture of the bell and stem. Later investigation showed this to be due to insufficient reinforcement in this area.

Table I compares computed capacities of the test caissons with the results of the pull-out tests.

Soil engineers also developed a general design formula for a typical belled caisson used as an anchor.

• **Design conclusions:** Major conclusions from the tests and design calculations were:

1. Substantially full static resistance of the clay was developed in side shear, with progressive displacement occurring for loads which exceeded that resistance. Pull-out resistance of the bell was identified by a second stage of yielding.

2. Bell capacity computed in terms of bearing pressure on the projected area of the bell agreed closely with the measured static resistance to pull out. Upper limit of the second load range was controlled by direct shear on a cylindrical surface on a projection of the bell circumference.

3. Design of a belled caisson can be based on computations using the shearing resistance at the yield value.

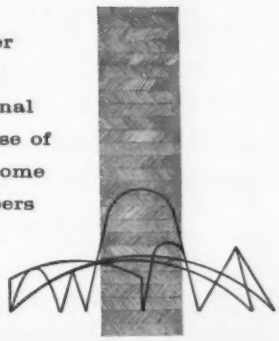
4. Design capacity should be checked by consideration of the second load limit corresponding to direct shear on the cylindrical projected surface of the bell circumference. This method should consider the weight component of the caisson and the surrounding soil at a recommended factor of safety of 2.

5. Minimum depth of the bell below the wall footing should be 10 ft.

St. Johns Episcopal Church, Plymouth, Michigan. Architects-Engineers: Daniels Associates, Ann Arbor, Michigan. Contractor: Burger Construction Company, Plymouth, Michigan.

Space provided: nave with seating for 340 worshippers; narthex; 48′x64′ fellowship hall; kitchen; robing room; ladies' parlor; office; study; mailing and storage; men's and women's rooms; choir loft and storage rooms. *Structural framing:* glulam rigid frames with curved arm members spaced at 16′ in nave; glulam beams spaced at 12′ in fellowship hall. *Exterior walls:* brick; window walls of ¼″ plate glass in wood frames; sliding glass doors with aluminum frames. *Interior walls:* exposed brick; white sand plaster on block and stud partitions. *Floors:* Terrazzo in narthex; carpet in aisles and chancel; vinyl asbestos tile elsewhere. *Heating and ventilating:* forced air with ducts beneath slab. System has summer blower switch for ventilation only. *Lighting:* fluorescent in fellowship hall; incandescent elsewhere. *Roof:* built-up roof with white vinyl and asbestos fibre over Douglas Fir Tim-Deck. *Area:* 10,580 square feet. *Cost:* $14.50 a square foot.

The intimate warmth and beauty of glulam members and heavy timber decking complement the architect's design to create the deep emotional response so appropriate in the house of worship. Genuine economy is a welcome by-product of these functional members which were produced under strict quality control by America's most experienced laminators.



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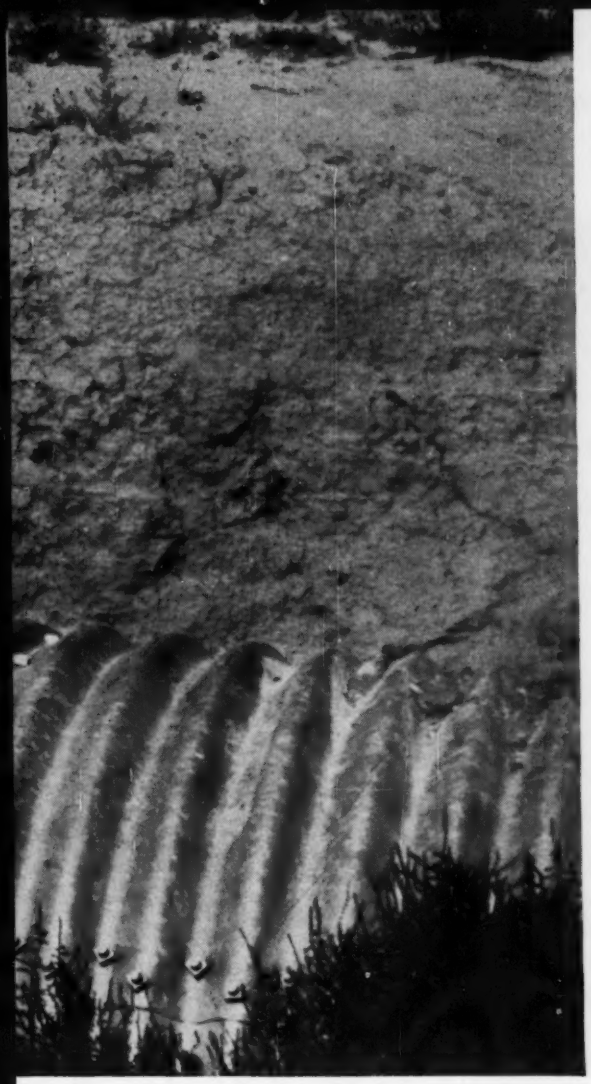

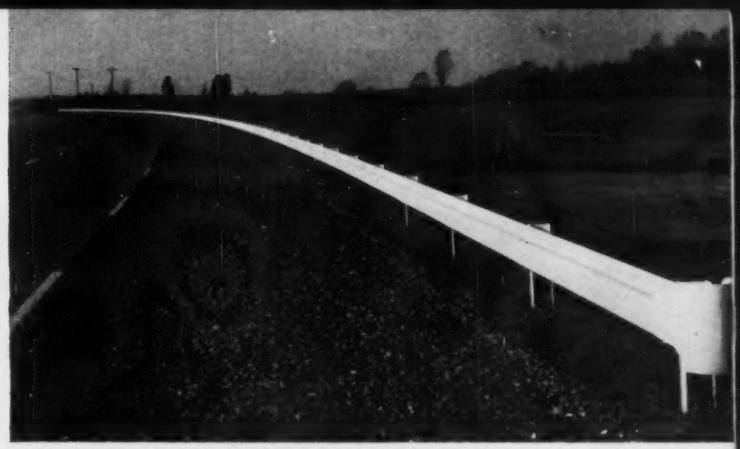

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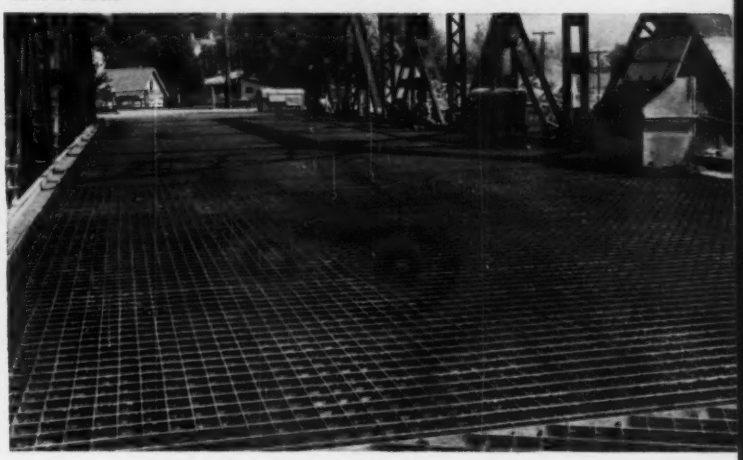

This eight-foot-diameter culvert was unearthed during a road widening project near Red Lake, Arizona. It had been buried under the roadway for about thirty years! When extension pieces were bolted on to make it longer, it was hard to tell the old from the new. Long life is only part of the USS AmBridge Sectional Plate story. The story begins with remarkably simple installation. Just smooth the grade line, set the sheets into place, bolt, and backfill. No need to build forms or sit out costly curing time. American Bridge has a new booklet about USS AmBridge Sectional Plate. Write for your free copy. General Offices: 525 William Penn Place, Pittsburgh 30, Pennsylvania. USS, I-Beam-Lok and AmBridge are registered trademarks

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Glen Canyon: Concrete on the Rocks

Big ice plant perches above cliff-hanging concrete plant.

By R. E. Lucas

At Glen Canyon Dam, Merritt-Chapman & Scott Corp. is operating one of the largest industrial refrigeration plants ever built. The reason for this is that mix temperature of the nearly five-million cu yd of concrete going into the arch must be kept at 50 F. Also, all in-place concrete is temperature-controlled for at least a month after casting.

Installed refrigeration effect of the jumbo-sized plant is 4,000 tons and it requires more than 7,000 hp to operate. Equipment alone for the plant cost $1.25 million. Over-all cost was $2 million.

Glen Canyon Dam is located on a sun-baked northern Arizona plateau on the Colorado River. Without refrigeration, mix temperature would reach 94 F on a typical summer day. But Bureau of Reclamation specifications set a maximum of 50 F when placed.

The Glen Canyon plant makes use of all the commonly accepted cooling methods used on dam construction except vacuum chilling. Neither cement nor sand are cooled.
It includes:

- Cooling the coarse aggregate by chilled water.
- Air-cooling the coarse aggregate in the mixing plant bins.
- Chilling the mix water.
- Adding ice to the mix.
- Cooling the placed concrete by circulating chilled water through embedded pipes.

Several notable modifications to these conventional practices are in use at Glen Canyon.

For air-cooling aggregate in the batch plant, the usual central bank of refrigeration coils connected by ducts to the individual bins is replaced by coils beside each bin.

Freezing of aggregate in the bins is prevented by thermostatic control, while defrosting and cleaning of the refrigeration coils is accomplished by automatic water flushing systems operating on a time clock.

Another innovation is automatic operation of the ice batching system. Previously, ice systems have required a man in the ice storage bin to keep

(Story continues p. 37)

***Mr. Lucas** manages the Lewis Refrigeration Co. of Seattle, the firm that designed and built the refrigeration installation at Glen Canyon.*

A contractor from Arizona reports:

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"We achieved the phenomenal installation rate of up to 947 feet in one hour on a 12-mile Transite Water Pipe job for the Oracle Village Water Company. Since the job called for stringing out the pipe, excavating, fine grading the trench bottom, installing, testing and backfilling, it took a well-planned operation and excellent teamwork by everyone concerned to get this rapid installation. Of course, a very large part of the credit has to go to Transite Pipe itself. Its long lengths, light weight and speedy coupling methods got the job done quickly, with a minimum of effort and with virtually no manual handling of the pipe.

"After completing each 1000 feet, we tested the line. The result? Not one leak in the entire 12 miles. I'm convinced that for fast, sure results, you can't beat Transite Pipe."

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Rigged entirely with Bethlehem wire rope, this 12 cu yd clamshell dredge is deepening the channel in Buffalo Harbor to facilitate the navigation of ships using the St. Lawrence Seaway. Operated by Great Lakes Dredge & Dock Company, the dredge is shown hard at work off the Niagara Frontier Port Authority Terminal.

The harbor improvement program is being undertaken in four stages at a cost of about $10 million. The work is due for completion in 1961.

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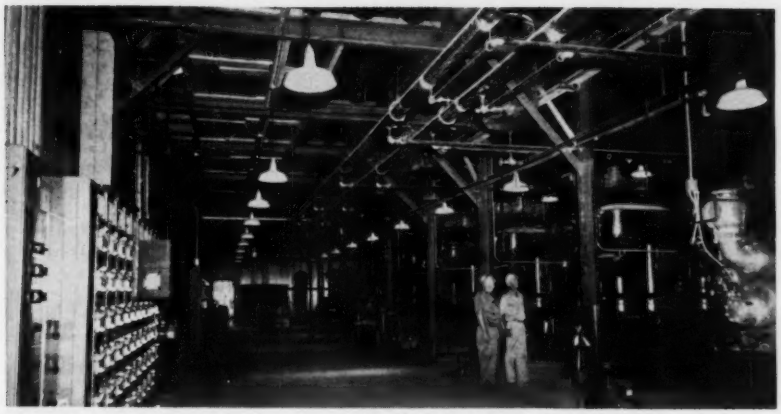


Big ammonia compressors are nucleus of 4,000-ton ice plant.

the ice friable and moving into screw conveyors.

At Glen Canyon, however, the flake ice falls from the ice-making machines onto a fast moving rubber belt, which carries it some 50 ft to a chute where it drops 125 ft into a small storage bin immediately adjacent to the batch plant weigh-hopper floor. The bin contains a 30-minute supply of ice. An adequate supply is assured by 22 ice-making machines, activated by automatic signals from the batch plant ice bin.

Topography at Glen Canyon brought about a variation from the usual practice of grouping at one location, all the equipment in a system for cooling in-place concrete. The main refrigeration plant had to be located at the top of the 700-ft-deep gorge because the sheer cliffs offered no site. But shell and tube heat exchangers for the cooling water are located down near the concrete placement level. This makes it unnecessary to pump cooling water up and down the cliffs and saves about 600 hp of pumping capacity. Only the refrigerant—ammonia—is raised from the concrete placement level to the main refrigeration plant.

The plant includes a battery of 18 ammonia compressors: four 125-hp, eight 600-hp, two 100-hp, one 450-hp duplex, two 150-hp, and one 25-hp. The four 125-hp compressors serve only the ice-making machines. The others are used for varied cooling purposes.

The compressors are serviced by a battery of eight condensers. Excess heat totaling, at the maximum, more than 1 million Btu per minute, is wasted to the desert air by a 15,000-gpm cooling tower.

There are ten shell and tube heat exchangers. Two of these are used to chill the mixing water. Three more chill water for cooling the coarse aggregate on the conveyor belts. The other five chill the cooling water for in-place concrete. They will be moved about four times during the three-year concreting operation.

The refrigeration plant was designed around a 480-cu-yd-per-hour concreting rate. On an average summer day, the aggregate temperature is 87.5 F, cement 150 F, Pozzolan 120 F, and water 80 F. To reduce the resulting 94 F mix temperature to the allowable 50 F, the following procedure is used:

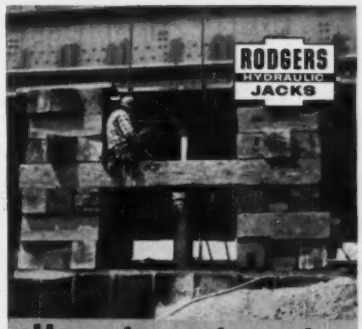
- Coarse aggregate is cooled to 50 F by spraying it with 1,200 gpm of water at 35 F on the conveyor belt from the stockpiles to the batch plant. This has a 22 deg cooling effect on the entire mix. It requires 830 tons of cooling capacity.
- Coarse aggregate ¾ in. and larger is air cooled to 35 F in four of the eight bins at the batch plant. This drops mix temperature 8 deg. It requires 270 tons of cooling capacity.
- Mix water is cooled to 35 F. This lowers mix temperature 5 deg. It requires 180 tons of cooling.
- Flaked ice is added to the mix to cool it 12 deg. This requires 300 lb of ice per 4-cu-yd batch.

These four steps produce a total cooling effect of 47 deg in the mix, resulting in a theoretical placement temperature of 47 deg. The 3-deg margin allows a small heat gain without exceeding the specified maximum placement temperature of 50 F.

In-place concrete cooling is accomplished in two stages. In the first phase, 45 F water is circulated from 12 days to nearly a month to remove the heat of hydration.

In the second phase, 35 F water is used for about a month to lower the concrete temperature to required maximums of 40 to 50 F in the top 275 ft of the dam and 40 F in the rest of the mass. Cooling to 40 F opens up construction joints to permit effective grouting.

Glen Canyon Dam is a project of the U. S. Bureau of Reclamation. L. F. Wylie is project construction engineer. A. R. Bacon is project manager for Merritt-Chapman & Scott, Corp., holder of the $108-million general contract.



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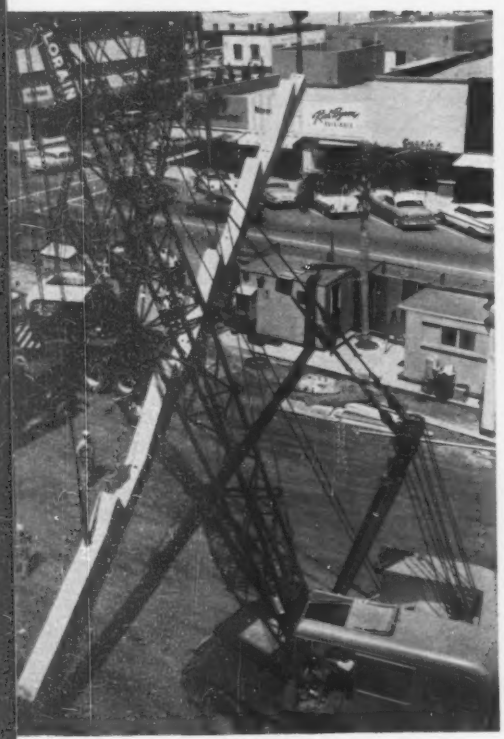
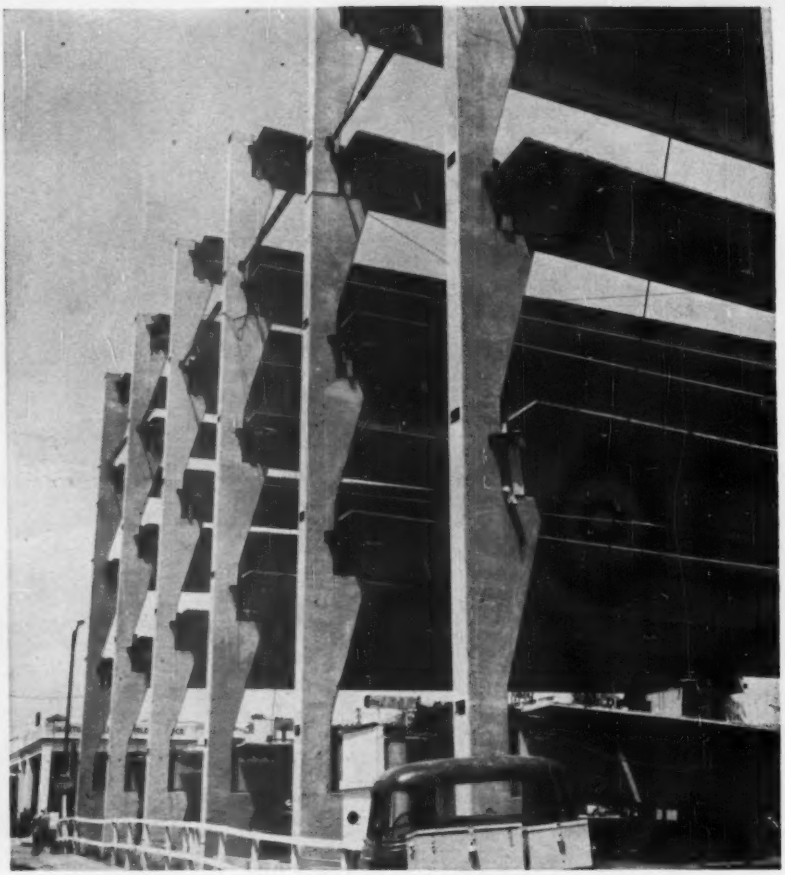


Cranes lift five-story column.



Tees slope from column seats to form a helical ramp.

Precast Rigid Frame for a Bargain

By post-tensioning precast columns together with prestressed tee girders, builders have held the cost of a rigid frame, five-story garage to $4.60 per sq ft. The structure is for the City of Beverly Hills, Calif.

The tee-girders span 75 ft between an interior row of columns and two rows of exterior columns. A cast-in-place shear wall stiffens the center line of columns. The girders slope between the column lines, so that in the completed structure concrete floor slabs spanning the girders form a helical surface. Access and parking areas spiral gradually from bottom to top of the garage.

The long-span concrete girders avoid cutting up the parking areas with closely spaced columns. The designers say only 130,000 sq ft of floor area is needed for the 400 car capacity. They say 185,000 sq ft would have been necessary with conventional short span reinforced concrete.

Columns were precast in one piece for the full height of the garage with deep, tapered girder seats at each floor level.

Pins cast into the seats held the girders in place during erection. And angle iron clips bolted through holes in the columns restrained the girders until final connections were made.

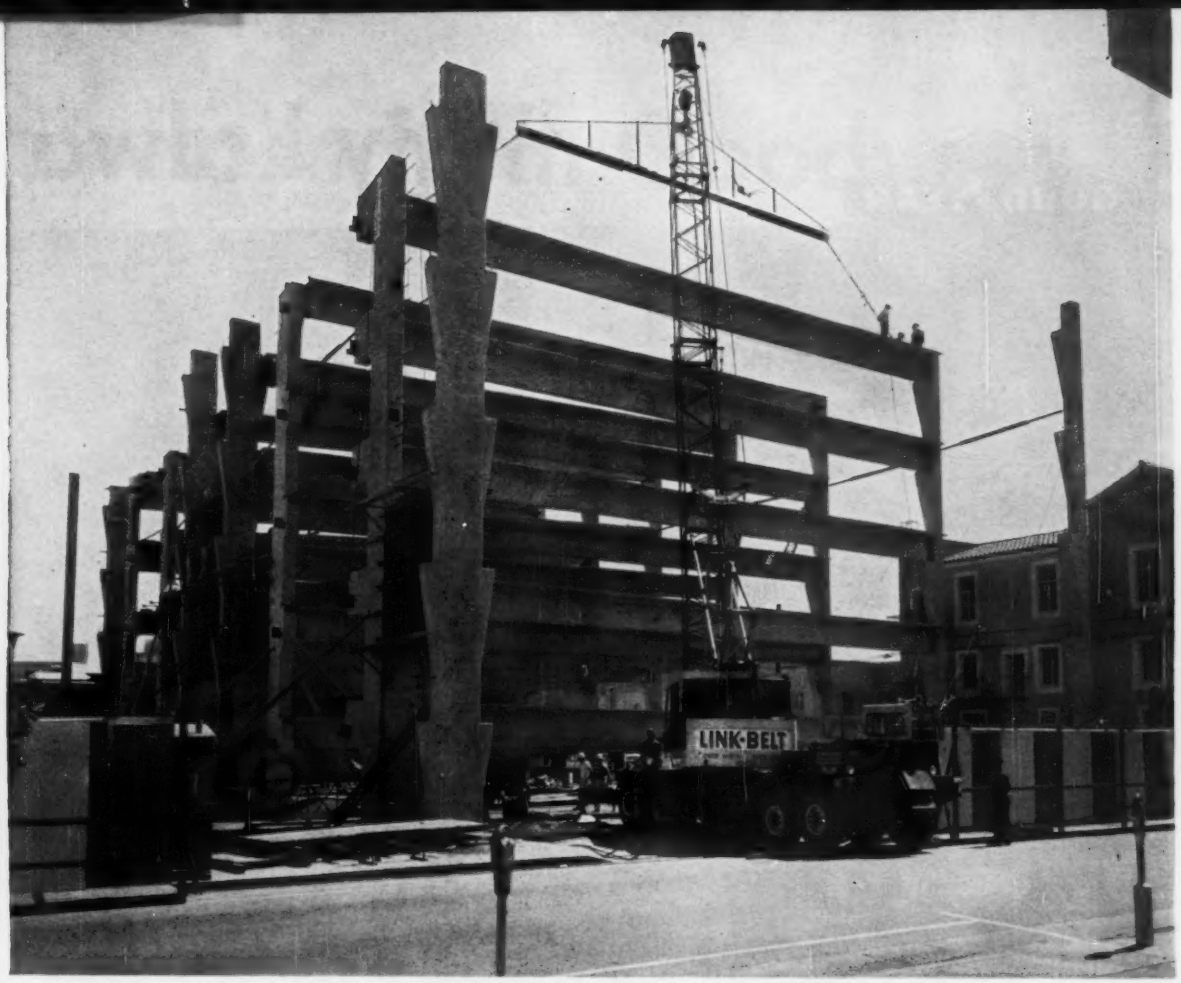
These frames, 20 ft c-c, are spanned by 5-in.-thick concrete slabs prestressed in two directions to make them continuous and to keep them crack-free and watertight without roofing membrane.

Two cranes erected the 24 columns and 77 tee sections in 18 working days. Both cranes worked together to lift the long columns into position on anchor bolts cast in the foundations. Then, while one crane held a column in place, workmen connected temporary braces to a completed stairwell and elevator shaft at one corner of the building. After erection crews finished placing the three rows of eight columns, other workmen concreted the central shear wall to the second-floor level for additional stability.

The cranes then shifted to the tee sections. Backing down first one aisle then the other, they erected the concrete girders for the full five-story height at each line across the garage.

The contractor developed movable forms for the floor slabs cast between the girders. Carpenters placed plywood panels on aluminum channels and supported these forms partly by hangers from the girders and partly by shores from the floor below. Electric elevators lowered the forms in sections up to 14 x 45 ft for movement from one pour to the next around the helical structure. Form coating on the plywood permitted reusing the forms 11 times without repairing or recoating the panels. Workmen tied three or four adjacent bays of concrete slabs together with tensioned cables and later connected them to adjoining slabs with couplers.

To keep weight low all concrete for the garage was made with lightweight aggregates. At the precasting plant, high-early strength cement provided 3,500-psi concrete in only 16 hours.



Truck cranes erect girders full height of garage at each bay in turn.

Garage

Post-tensioning cables from the girder webs were connected to bolt assemblies extending from the columns. Post tensioning to convert the structure to a rigid frame came only after crews completed the floor slabs and masons grouted the girder-column joints.

Since the structure acts as a rigid frame, the bents are calculated to resist earthquake forces parallel to them. Forces in the other direction are resisted by the center shear wall.

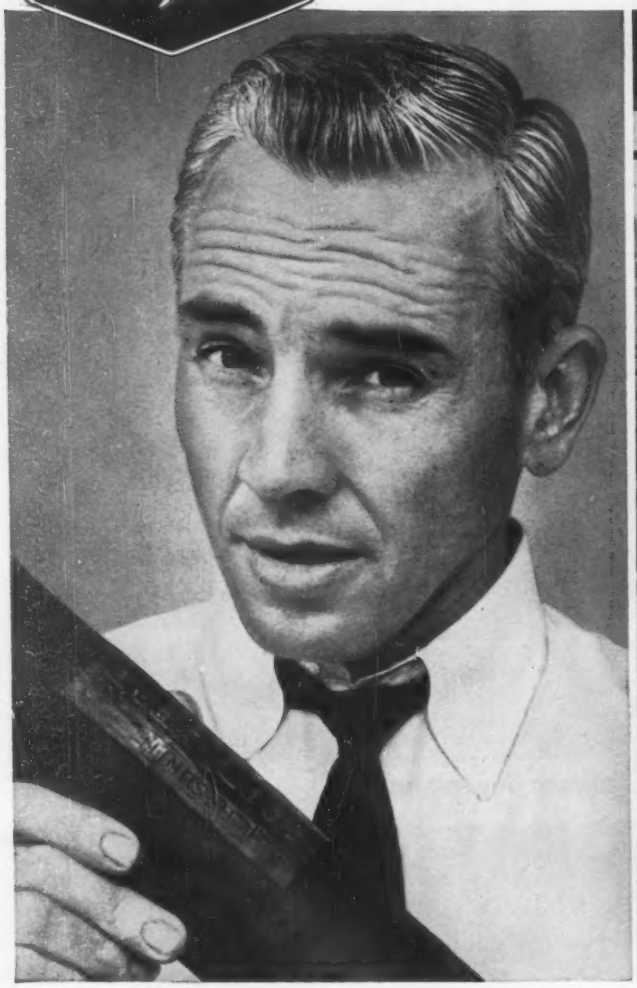
Construction cost – $599,000 – included foundations, electrical and mechanical work and some architectural items.

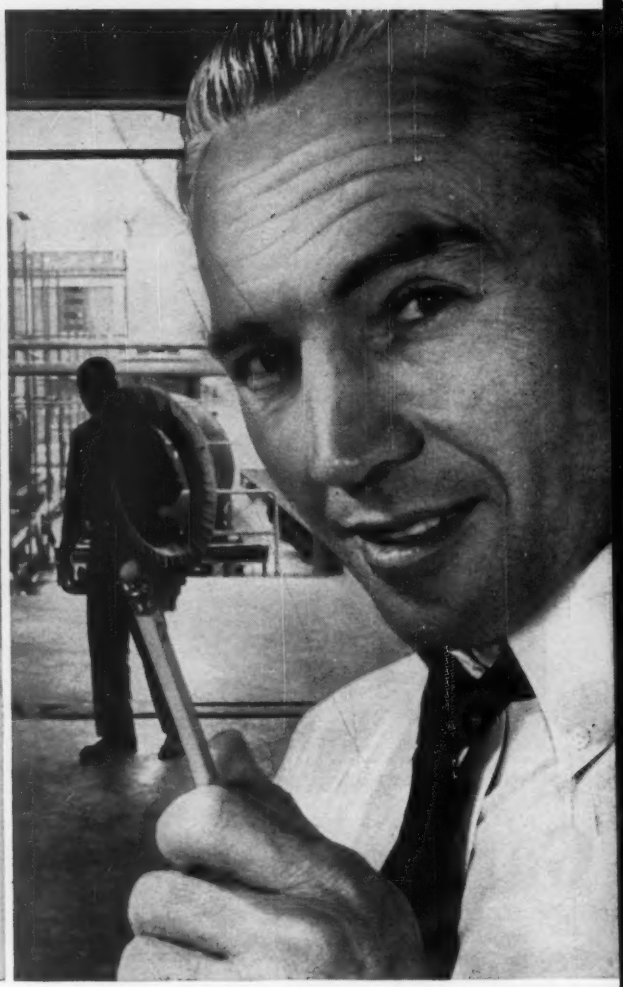
Welton Becket and Associates were the architects. Structural design was by Edward K. Rice and Ray Itaya of T. Y. Lin and Associates. A joint venture of C. L. Peck and Ellis E. White Co. built the garage. Wailes Precast Concrete Corp., Sun Valley, Calif., furnished and erected the prestressed columns and girders. Charles H. Rice did the post-tensioning and built the formwork for cast-in-place concrete.

Completed garage holds 400 cars on ramp floors.

Why I always

GOODYEAR





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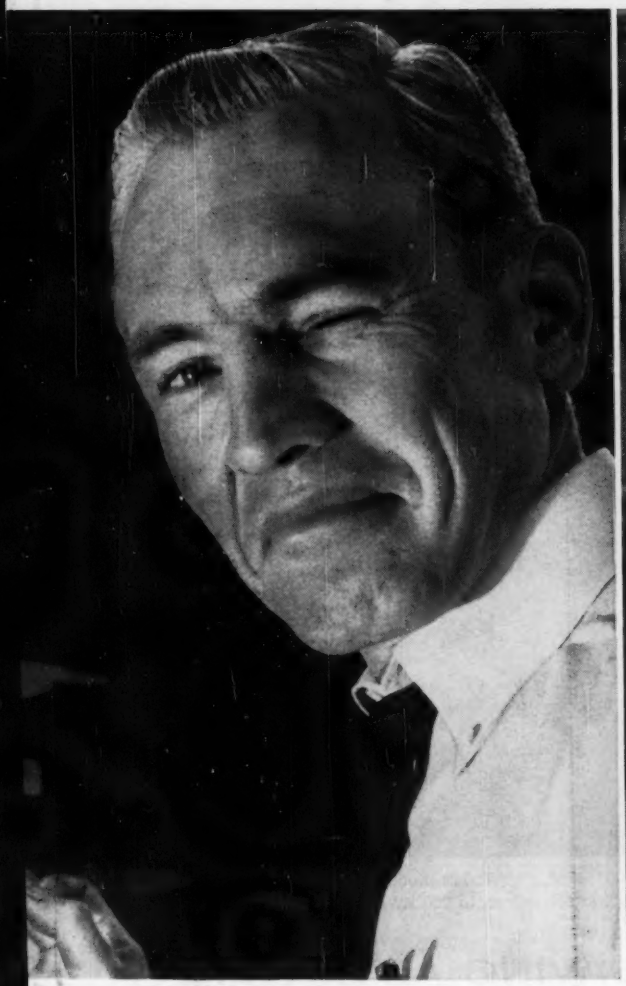

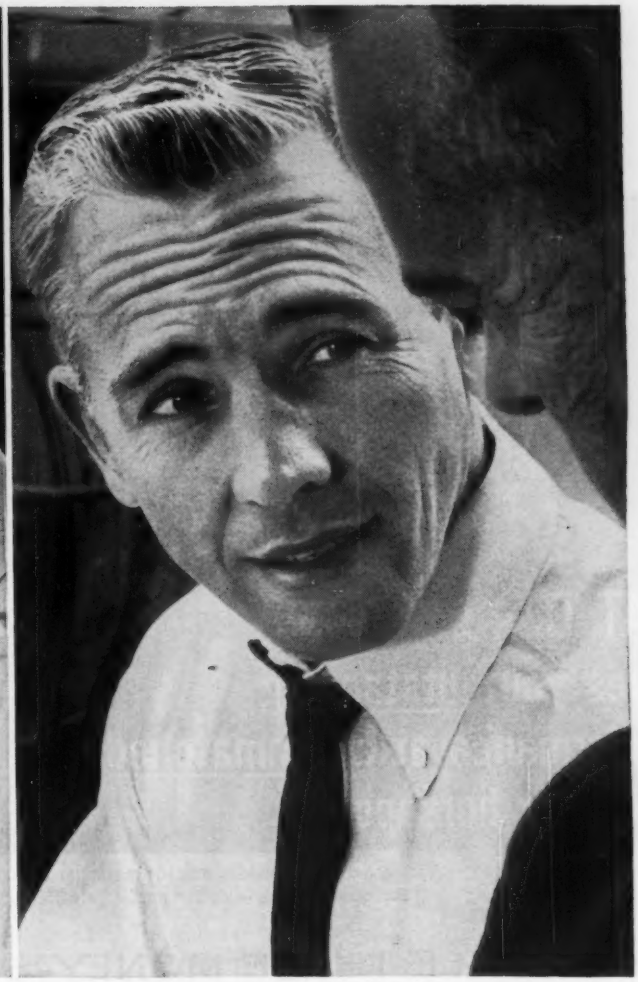

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NEW HP

CAT D343 gives you outstanding performance at an unmatched price per horsepower

Turbocharged-Aftercooled D343 provides 420 HP maximum at 2000 RPM, electric set produces up to 250 KW.
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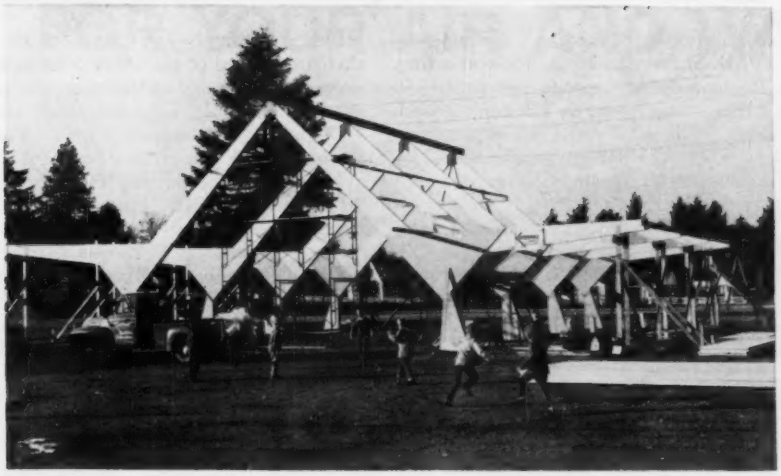

Prefab Makes Debut at School

To pupils, it was only a playground shelter. But to the Douglas Fir Plywood Association, it was significant as the first use of factory-assembled delta frames.

These frames are tapered box-beam bents forming a central (inverted-V) section of a roof and carrying cantilevered wings on one or both sides.

A family of 608 structural combinations—for public, commercial and light industrial buildings—has been designed from basic delta frame components. Structures can be roofed with stressed-skin panels or conventional systems and enclosed with curtain walls.

The prototype frame pictured above provides a roofed area of 82 x 56 ft, on the playground of Park Lodge elementary school, near Tacoma, Wash. Overall width of the bents is 80 ft for the delta span and 20 ft for each cantilevered wing. All beams are 6 in. wide and have 2 x 4 flanges and webs of ¾-in. medium-density plywood. Sloping beams are 28 ft long, tapered from 3 ft to 1 ft; wing beams are 24 ft long, tapered from 32 in. to 1 ft.

Because the triangular gussets joining wing beams and sloping beams were fastened with nails, no structural gluing was required on the site. Metal gussets, fastened by bolts, join sloping beams at the ridge.

To provide a fine paint surface and to cover the structural plywood, each triangular gusset was faced with a ⅛-in. layer of medium-density plywood.

Mosaic roof of 4 x 16 and 4 x 24 ft stressed-skin panels was laid over a framework of 2 x 4 stringers, and fastened to the box beams with 7- and 8-in. spikes driven through prebored holes at each stringer. Panels have tongue-and-groove edges, a top facing of ⅜ in. and a ⅛-in. bottom facing.

To increase the load-carrying capacity of the panels, they were cantilevered both ways over beams, so that each panel supports the next one at end connections. Allowable load of wing spans was thus increased from 30 to 39 psf.

Finish for the roof panels is a factory-applied coat of duPont Hypalon (a synthetic rubber). Hypalon tape, developed by Minnesota Mining & Manufacturing Co., was used to seal and weatherproof roof joints.

Architect is Robert Bruce Waring. Bents and stressed-skin panels were fabricated in Portland, Ore., by Simpson Timber Co. Douglas Fir Plywood Association will job through 28 licensed fabricators of the Plywood Fabricator Service Inc., 3500 E. 118th St., Chicago, Ill. Douglas Fir Plywood Association, Tacoma 2, Wash.

Personnel Truck Doubles As Mine-Utility Truck

A new personnel carrier which can be adapted as a utility truck is designed for use in low headroom mines.

The carrier is 3 ft 9 in. high, 6 ft 5 in. wide and 17 ft 8 in. long. Wheelbase is 8 ft 2 in.

The truck has four-wheel drive, four-wheel steering and four-wheel hydraulic brake control. It is equipped with an exhaust scrubber, has 7.50x16 eight-ply traction tires. A 12-volt lighting system and Delco Remy low-cut-in generator are also included. Carrying capacity is 5,000 lb. Speeds up to 20 mph are possible. Getman Bros., South Haven, Mich.

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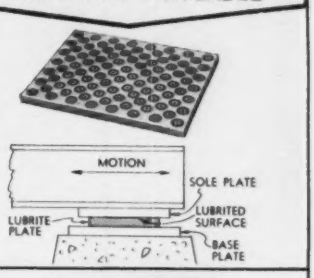

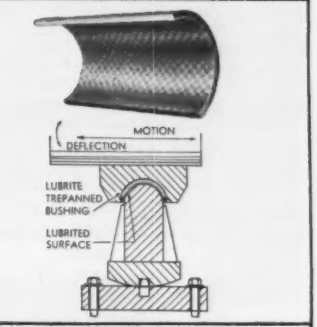

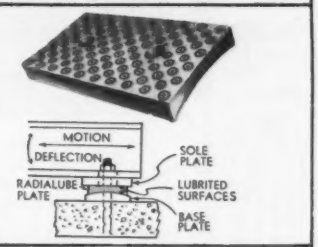

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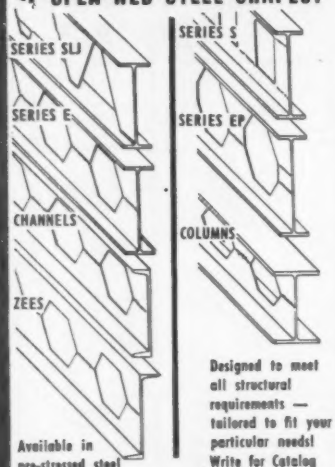

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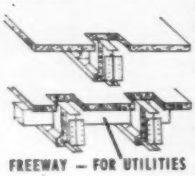

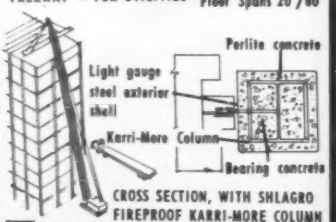

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New Product Briefs

• **Lightweight blasting machines** – VME-Sr., weighs 15 lb, 450-volt rating. Recommended capacity: in series—50 blasting caps primary, 200 caps secondary; parallel—50 caps; series-parallel—1,200 caps. VME-Jr., weighs 8 lb, 225-volt rating. Recommended capacity: in series—30 caps primary, 100 caps secondary; series-parallel — 240 caps; straight parallel not recommended. Maintenance contract included. VIBRATION MEASUREMENT ENGINEERS, INC., 725 OAKTON ST., EVANSTON, ILL.

• **Dewatering pumps**–Two units, 40-T and 41-T, are self-priming, powered by air-cooled industrial engines. The 40-T pumps 660 gpm; the 41-T, 500 gpm. Trailer mounted on pneumatic tires. HALE FIRE PUMP CO., CONSHOHOCKEN, PA.

• **Chlorinator**–Model 845 for sterilizing drinking water, swimming pools, sewage or water treatment plant effluents. Mounts on a wall. Feed ranges from 2 to 100 lb a day are varied by changing the meter tube. Weighs 3¾ lb, is 13 in. long. B-I-F INDUSTRIES, P. O. Box 276, PROVIDENCE 1, R. I.

• **Flume liner**–Polyester reinforced with glass fiber. Throat sizes from 3 in. to 8 ft to measure flow in open channels in ranges from 10 gpm to 210,000 gpm. B-I-F INDUSTRIES, P. O. BOX 276, PROVIDENCE 1, R. I.

• **Drafting table** – Pedestal-mounted drafting table has vertical traverse of nearly 2 ft, angle adjustments from horizontal to vertical and full-circle rotation. Adjustments are hydraulically powered, controlled by a pedal and hand knob. With 40x60-in. board, $250 fob York, Pa.. ISIS INC., BOX 1062, YORK, PA.

• **Catch basin cleaner**–Model 2-M Elgin Eductor has 2,000-gal tank. Catch-basin and underground cleaner also designed for street flushing, fire-fighting, sewer back-flushing and insecticide spraying. THE ELGIN CORP., 222 WEST ADAMS ST., CHICAGO 6, ILL.

• **Demineralizers**–Line of industrial water demineralizers has lucite columns so that operator can watch the condition of the resins and observe the back-washing operation. Two-bed model TR-3 has a capacity of 150 gallons per hour. Mixed-bed demineralizer model MR-2 has flow rate of 120 gallons an hour. BARNSTEAD STILL & STERILIZER CO., 225 LANESVILLE TERRACE, BOSTON 31, MASS.

• **Plastic skylight**–The Sky-Glo is a skylight molded of glass-fiber reinforced polyester. The manufacturer claims that the Sky-Glo is shatterproof and strong enough to support a man. Fire retardant and maintenance-free, it is available in sizes ranging from 20 by 20 in. to 4 by 8 ft. FIBERGLASS SUPPLIES, INC., MALIBU, CALIF.

• **Plastic chute liner**–Fabric backed urethane lining, called Armstrong PO-663, is said to reduce abrasion on chutes that carry ore slurries, rock, sand and gravel. The material, which can be installed by cementing or bolting, comes in stock sheet sizes from 12 by 20 in. to 96 by 40 in. ARMSTRONG CORK CO., LANCASTER, PA.

• **Pocket penetrometer**–For determining initial set of concrete. Penetrating resistance in psi shown by indicator; scale range: zero to 700 psi; 7 in. long. SOILTEST, INC., 4711 W. NORTH AVE., CHICAGO 39, ILL.

• **Acoustical ceiling tile** – Kleentone. Textured or smooth plastic face on perforated wood fiber tile. Available in 12x12 in. with beveled-butt or tongue-and-groove edge, and 12x24 in. with tongue-and-groove edge. Same price as fissured wood-fiber ceiling tiles. U. S. GYPSUM CO., 300 W. ADAMS ST., CHICAGO 6, ILL.

• **Core drill, auger**–SP-68 mounts on flat-bed truck or trailer. Handles coring, sampling and augering for water wells, foundations, etc. Auger can go down to 300 ft; core drills to 1,500 ft. Diameters up to 24 in. Has four-speed cathead hoist, four-speed forward transmission and a reverse gear, hydraulic drill head. ACKER DRILL CO., INC., SCRANTON 2, PA.

• **Asbestos sheeting screws**–Besto-Bond fastener screw has a cone-shaped neoprene seal bonded to dished metal washer. The seal is watertight with normal expansion and contraction of sheeting. Available in Type A and B screws. ATLAS BOLT AND SCREW CO., 1111 IVANHOE ROAD, CLEVELAND 10, OHIO.

• **Flooring compound**–Penntrowel Latex is a two-component mortar of liquid latex dispersion and dry cement-aggregate premix that can be screened and troweled in one application. CORROSION ENGINEERING PRODUCTS DEPT., PENNSALT CHEMICALS CORP., NATRONA, PA.

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NAYLOR Wedgelock couplings make a positive connection securely anchored in standard weight grooved ends.

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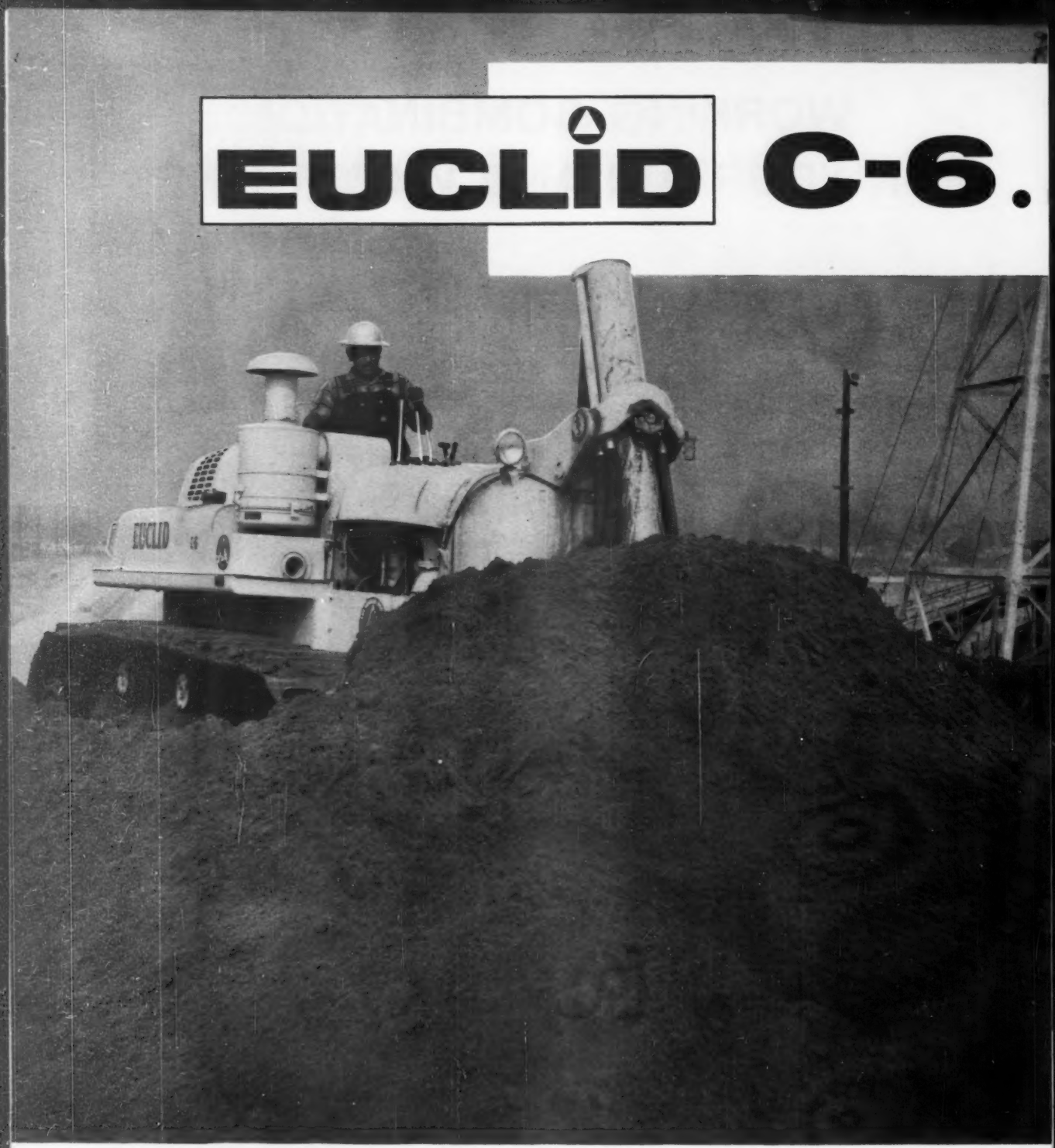

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now even more work-ability!

With Torqmatic Drive and full-power shift, the "Euc" C-6 provides fast-as-a-fox maneuverability . . . changes direction, from forward to reverse and back again with just a flick of the wrist. That kind of performance calls for fast blade action so the full work capacity of the C-6 can be utilized. Conventional tractor hydraulic systems didn't measure up . . . in blade speed, low maintenance cost and freedom from excessive downtime resulting from wear and heat build-up.

Euclid and Gar Wood engineers combined their years of hydraulic experience with construction equipment and have developed a system that puts the C-6 even further ahead of other dozers in the same class. Incorporating a variable volume pump and single hydraulic cylinder, the C-6 with hydraulic blade provides important advantages in operation and maintenance . . . advantages that are further proof of the C-6 being the lowest cost tractor in the 200 h.p. class, and most versatile by far!

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- **Fast blade speed—up or down . . .** almost twice as fast as competitive units
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- **Better visibility . . .** blade corners not hidden by hydraulic cylinder or "A" frame
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- **Less downtime . . .** only one cylinder—no high pressure on drive shaft seal—heat problem eliminated—pump works only when pressure is needed for raising or lowering blade

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. . . with the Country's first application of numerically controlled machining to structural members . . . automatic welding of high-strength (T-1 and N-A-Xtra) steel . . . conveyorized painting of structural components. These are solid achievements—'system-engineered' by Mahon and now at work on the joint Indiana-Kentucky, New Albany Bridge project. To Mahon's Structural Division these fabrication innovations mean increased productivity; to you they mean design opportunity, highest quality and greater cost-savings . . . plus on-time delivery.

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MAHON

A Fighter for Free Enterprise

The new president of the Consulting Engineers Council, Harold P. King of King, Benioff & Associates, Los Angeles, is one of those pipe-smoking, quietly competent people who make up the gristle of a professional organization. While content to run a small structural consulting firm specializing in interprofessional work, he knows the problems that gnaw at consultants, and has spent most of his recent life boosting organizations that blunt their teeth.

In 1952, he was president of the Structural engineers Association of Southern California, in '54, president of the Structural Engineers Association of California. In 1958, he was president of the Consulting Engineers Association of California, and last year he was vice president of the organization he now heads.

As sixth president of the relatively infant CEC, he intends to follow the broad paths laid out by the founders and attack what he thinks is the real nemesis of private practitioners—the growth of government work in relation to private work. "If we can solve this problem," he says, "it in turn will solve other problems. It's a matter of proving that free enterprise is the best way of doing things—a matter of standing on our own two feet."

Mr. King lists three other major problems of the consultant: ethics, office practice and how to obtain clients.

On ethics: ("We like to call it 'Rules of Practice'," King says) the engineering profession does not condone competitive bidding. "You can't determine the capability of a consulting engineer by price. Consultants should be ethical to other engineers, of course, and certainly work for the best interests of the client and the public, but competitive bidding is not in the interest of the client, nor of the public in the case of public work," he says.

"Office practice is the cost of doing business," says Mr. King. "Many engineers setting up practice forget that there are certain overhead items beyond salaries paid. This is one of the problems CEC is grappling. Its office practice committee is making a thorough study of items that make up the cost of doing business. In addition to the usual overhead—rent, utilities, supplies, reproduction, 'phone and travel expenses—a firm must not neglect the cost of public relations or business promotion, insurance of all kinds, depreciation of equipment, fringe benefits such as hospital medical and life insurance—and the now unavoidable coffee break."

"Let's stand on our own two feet,"—CEC's new president, Harold King.

"Clients come," he says, "as a result of public relations, and the best public relations is doing a good job. Being professional, we don't believe in advertising as such. Recommendations from satisfied former clients are what we depend on. Too, if you spread the word around, people will know you're available."

Mr. King thinks that the most fruitful place to attack these problems is in the schools. "CEC would like to get something in college courses to to advise potential engineers on the professional side of engineering," he says. "Not only government but some businesses stress the 'security' feature of a career. Young engineers are apt to forget there's another side to engineering—one that's much more interesting.

"We want to install in the prospective engineer, while he's still in school, the realization that he's about to become a member of a highly respected and old profession. We want him to be professional and believe in free enterprise and individual initiative. If he has these ideas well in mind, he will certainly consider consulting engineering as his life work. We intend to accomplish this by encouraging our engineering schools to include professionalism, business subjects, engineering ethics and like subjects in their curricula. And engineers in private practice can also offer their services to schools to lecture on these subjects."

Although Mr. King graduated from Iowa State College with a B. S. in architectural engineering, he got his early experience in Pittsburgh with McClintic Marshall Co., structural steel fabricators. In 1931 he became the engineer partner of Barcume & King, Architect and Engineer, Los Angeles.

After three years' service in the Seabees during World War II—he's retired as a Commander—and five postwar years on his own as a structural engineer, he moved his office out to Sherman Oaks in the Los Angeles suburbs, King teamed up with Ben Benioff six years later (1956). Besides the two principals, the firm now has three associates.

The headquarters of the firm, in a streamlined new professional building, is not far from its latest project—a four-story, 120-bed addition to the Valley Presbyterian Hospital.

Designed by Charles Luckman Associates, the $2.1-million, 60,000-sq-ft structure will be of reinforced concrete. But what makes the project a pacemaker is its circular shape. The design is similar to the original three-story, 63-bed unit—one of the first circular hospitals in the country and a subject of

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considerable controversy. But the practicality has been tested and, to the surprise of skeptics, the circle works. It not only reduced nurses' step 37% but put all patients rooms on the out side perimeter. All rooms have floor-to-ceiling windows shaded by vertical sun control louvers.

One thing Mr. King has discovered for himself in his years as a consultant is the value of interprofessional contacts. He is pleased with the way other professional organizations have not only accepted CEC, but have cooperated with it. "As a result, we have many liasons and contacts with these other, older professional groups," he says.

"The Council has 1,200 firms represented in 32 state groups. We believe it has made great strides. There is a real need for it to represent itself to the public and to the government, and to consolidate the efforts of the consulting engineering organizations throughout the country."

Briefs . . .

Education

Rolf Eliassen, acting head of Massachusetts Institute of Technology's department of civil and sanitary engineering, will join the Stamford University faculty as professor of civil engineering next fall. A specialist on pollution control in the development of water resources, he will fill a new position made possible by a $32,500 training grant from the U. S. Public Health Service.

Richard F. Humphreys will become the president of the Cooper Union for the Advancement of Science and Art in New York City next June. A nuclear physicist, he is now vice president of the Illinois Institute of Technology, Chicago.

Warren A. Hall has been named director of the University of California's state-wide Water Resources Center, succeeding **Martin R. Huberty,** who died last December. An authority on fluid mechanics, he has been associate professor of engineering and irrigation at the university.

Associations

The American Sanitary Engineering Intersociety Board has appointed **Thomas R. Glenn, Jr.,** executive secretary. His office will be at the Board's new address: 117 Benner St., Highland Park, N. J.

Matthew L. Rockwell, architect-engineer of Winnetka, Ill., has been named director of the division of public affairs of the American Institute of Architects. The division, recently created under a reorganization of AIA headquarters, has charge of public and government relations, all AIA publications and all programs related to housing and community planning.

Arthur J. Lichtinger, executive vice president of the Wellman Engineering Co., Erie, Pa., has been elected president of the Construction Industry Manufacturers Association. Members of the association produce about 95% of the construction equipment sold in the U.S.

G. H. Garrett, of the Thompson Pipe & Steel Co., Denver, Colo., has been elected president of the National Corrugated Metal Pipe Association.

Honors

The American Institute of Steel Construction has awarded the fourth J. Lloyd Kimbrough Medal to **Ludwig Mies van der Rohe** for "furthering public awareness and appreciation of the esthetic possibilities of exposed structural steel."

The American Institute of Architects awarded its 1961 Gold Medal to Swiss-born architect **Le Corbusier** (real name: Charles-Edouard Jeanneret). His largest project is the complete planning and design of Chandigahr, a city for 150,000 people to be the capital of Punjab, a state of India. He is now a French citizen with offices in Paris.

Ieoh Ming Pei, of I. M. Pei and Associates of New York City, has been awarded the 1961 Brunner award, an annual $1,000 prize given by the National Institute of Arts and Letters for excellence in architecture.

Five engineering educators received ASCE's 1960 research prizes at the Society's convention at Phoenix. Winners: **David K. Todd,** Civil Engineering Department, Universiay of California, Berkeley, for his studies in groundwater hydrology; **Bruno Thurlimann,** Department of Civil Engineering, Swiss Federal Institute of Technology, Zurich, for his contribution to the development of plastic design concepts; **Donald R. F. Harlman,** Hydrodynamics Laboratory, Massachusetts Institute of Technology, Cambridge, for his contribution to knowledge in the field of hydraulics; **Phil M. Ferguson,** Department of Civil Engineering, University of Texas, Austin, for his contribution to knowledge of the behavior of concrete structures; and **Raymond Clough,** Department of Civil Engineering, University of California, Berkeley, for his contribution to knowledge of the dynamic behavior of complex structures.

Ernest R. Vick (left), Secretary-Treasurer, and Duane Lintecum (center), President, Vick-Lintecum General Contractors, Inc., North Kansas City, Mo., showing Don Bevan, their Dodge Representative, around one of their current jobs.

"We've found Dodge Reports essential to starting our business—and vital in running it."

"We began business in 1959, and our first job—an $88,000 church contract—was obtained directly from information in Dodge Reports," Messrs. Lintecum and Vick state.

This year, the partners estimate that 30% of their total business comes from leads in Dodge Reports, and they expect they will do close to a million dollars overall in commercial, industrial, school and church contracts. They bid work as far away as 400 miles, and Mr. Lintecum says, "We depend on Dodge for a perfect picture of any subcontractor we may need in distant localities. We find the results as good as judgment based on our own personal knowledge."

The partners follow their Dodge Use-Plan carefully. They go through their Dodge Reports first thing every morning. They take note of jobs their firm can handle and screen them further to select the ones they'd like to bid on. "After we have submitted our bid, we wait for the Dodge Report that lists the three low bidders," they say. "Even if we're not among the three, the information is valuable, because we can compare our own bid and thus have excellent control of our own efficiency. Following Dodge Reports on work we do not bid gives us the benefit of keeping informed on all construction activity. And checking subcontractor lists helps us identify subs bidding for certain types of construction work."

Both partners agree that without Dodge Reports they would have to restrict their operations to an area within 35-miles of Kansas City instead of the large bi-state area they now effectively cover.

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Why Armco Pipe Piling

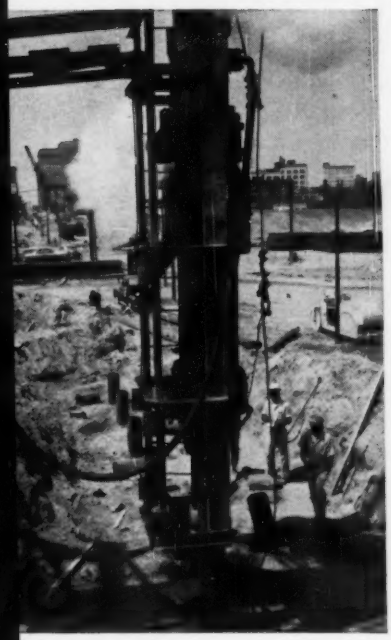
1.

3.

4.

1. Twin bridges on exposed Armco Pile bents carry Interstate 71 over Clear Fork Creek in Ohio.
2. Armco Piling is driven for foundation of bridge abutment on Cleveland Innerbelt — part of Interstate 90 in Ohio.
3. Here are 60-foot lengths of Armco Piling at site of foundation for approach work of new Woodrow Wilson Bridge at Alexandria, Virginia. Interstate 495.
4. Interstate 10 construction at Lake Charles, Louisiana, features foundation of Armco HEL-COR® Pile Shells.
5. Bridge abutment on Interstate 5W in California will rest on Armco Pipe Piling foundation. Note batter piles.

and Pile Shell Get the Important Jobs
on the Interstate System



Interstate Highway construction, with its controlled access requirements, puts the spotlight on bridges. To handle the tremendous job of foundations for the hundreds of bridge piers and abutments, highway builders are relying more and more on the Armco family of foundation products. Why? *They have been proved in service.* Engineers and contractors know what they will do from past performance.

Armco Pile Shell is a lightweight, helically corrugated shell. It is supplied in specified lengths—*any* lengths up to 64 feet. It is well known for its uniform roundness that makes splicing easy. Salvage of short cut-offs is practical.

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2.

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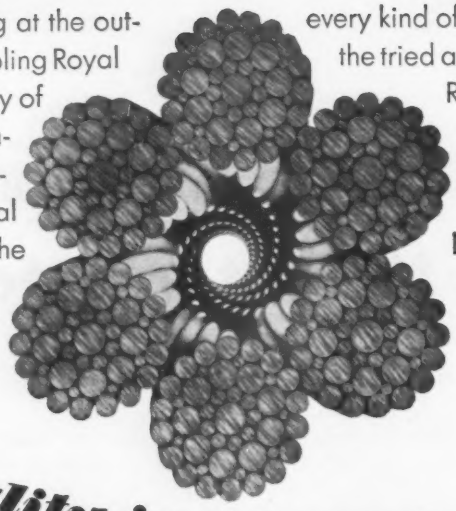

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Materials Prices

Monthly Market Quotations By ENR Field Reporters

See following ENR issues for OTHER PRICES:

- Wood Products, Glass, Explosives, Chemicals: Last, Apr. 20; Next, May 18.
- Clay Products, Lime, Plaster, Paint, Roofing: Last, Apr.27; Next, May 25.
- Wate Rates, Building Board, Lath, Insulation: Last, Apr. 27; Next, June 1.
- Cement Aggregate, Ready Mixed Concrete, Asphalt: Last, May 4; Next, June 8.

Iron and Steel Products–F. O. B. Warehouse, Per 100 lbs., Base Price

Item	Unit	Atlanta	Baltimore	Birmingham	Boston	Chicago	Cincinnati	Cleveland	Dallas	Denver	Detroit	Kansas City	Los Angeles†#	Minneapolis	New Orleans	New York	Philadelphia	Pittsburgh	St. Louis	San Francisco	Seattle	Montreal	Toronto
Struct. shapes	Cwt	$.801–8.36EsV	$9.70	$9.00cty	$8.21–9.31KzsV	$7.07–8.34ysV	$7.64–8.91styV	$7.46–8.73tysV	$7.71–9.49MsV	$8.24cK	$7.64–8.91MsV	$9.90sT	$8.70–10.45kteV	$7.78–8.17ysV	.....	$8.02–8.84Vss	$7.35–8.40zsV	$7.07–8.34ayV	$7.30–8.57stxyV	$9.40–11.25zsV	$8.60–10.80aDsV	$7.90–8.60CF/8.20–8.90AiF	$9.20H
Reinf. bars, new steel	"	8.50	9.00T	8.51–9.94tyV	8.75t	6.75–6.90guV	8.16t#	6.70rt	8.50	9.35	7.37	8.21N	7.35frt	9.26T	$8.00gktz	8.60ty	8.43uy	7.35y	7.35#txQ	8.25jS	8.85DM	7.00/7.50FGi	7.50
Reinf. bars, rail steel	"	.....	.....	8.51–9.94tyV	8.75t	6.75–6.90guV	.....	.....	8.50	.....	11.85	.....	.....	9.26T	.....	8.60y	9.30y	.....	7.35#txyQ	.....	.....	7.00/7.50FGi	7.50
Expanded metal lath & std. diamond mesh, 3.4 lb	"	43.50	44.50	61.00pK	47.00K	52.00#U	44.50Kg	42.50KL	44.00u	51.17n	67.00 O	51.00	55.00S	44.50K	63.00K	50.00n	45.50#U	58.50#rw	64.00wxK	53.00S	67.00#nD	65.700b	49.50qI
std. ribbed, 3.4 lb.	"	48.00S	49.00	67.00pK	51.00K	63.00#U	48.50mnKg	46.50KL	48.50w	56.35n	74.00 O	55.5G	64.00S	49.00K	69.G0K	58.00no	50.00#U	64.50#rw	65.00wxK	58.00S	73.50#nD	70.20h	44.85qI

Reinforcing Bar Extras, per cwt, N. Y.—• Quantity (applies to LCL shipments only): under 1,000#, +$1.80; 1000–1999# +$1.50; 2000–4999#, +$1.20; 5000–9999#, +90¢; 10,000–19,999#, +60¢; 20,000–29,999#, +30¢; 30,000–39,999#, +10¢; 40,000# & up, none. • Size††: #2 +$2.50; #3 +$1.40; #4 +$1.00; #5 +70¢; #7, #8, #9, #10, #11 +50¢ • Bending: heavy, +90¢; light +$2.20 (except in New York City and surrounding metropolitan area where bending must be done on the job). • Engineering (details and placing from designs by others): over 500 tons, +45¢; 200–499 tons, +50¢ but not over $4500; 75–199 tons, +65¢ but not over $2000; 20–74 tons, +75¢ but not over $975; 5–19 tons, +85¢ but not over $300; under 5 tons, +$1.00 but not over $85. Min. charge $25. Design only: +60¢.

Structural Shape Extras, per cwt, Chicago, Cincinnati, Cleveland, Dallas, Detroit, New York, Philadelphia, St. Louis and Pittsburgh. Item; 10,000# and over, base, 5,000–9,999#, +10¢, 2,000–4,999#, +35¢, 1,000–1,999#, +85¢, 400–999#, +$1.75, 100–399#, +$1.75, under 100#, +$1.75. Order: 20,000# and over, base, 10,000–19,999, +25¢, 5,000–9,999, +65¢ 2,000–4,999, +$1.50, 1,000–1,999, +$2.50, 400–999, +$4.00, under 400, +$8.00. Item extras do not apply in Chicago, Cleveland, Cincinnati, Detroit and St. Louis. •‖ Delivered. •* Aver. of Canadian & American. •‡‡ add 4% sales tax. •a 2000–4999#. •b 10,000–19,999#, fob city. •c 20 tons or over. •d 10,000–29,999#. •e intermediate struct'l. •f incl. delivery in free zone. •g CL. •h list price; dominion tax exempt; add provincial and municipal taxes. •i add provincial and municipal sales taxes. •j intermediate and hard grade. •k fob city. •l delivered; contractor to do unloading. •m copper alloy. •n LCL. •o asphalt coated. •p 500 sq yd. or more. •q 2.5 lb. •r less 2% disc. for cash. •s 10,000# item in 20,000# order. •t less ½% disc. 10 days. •u add 10¢ switch. •v incl 15¢ del. •w truck lots. •x add 2% sales tax. •y add 15¢ del. •z add 10¢ del. •A American made. •C Canadian made. •D ½% for cash. •E 30,000# or over. •F Federal tax exempt for bldgs. •G add 10¢ del. •H $8.85 without tariff charges. •I 3 lb $80.00. •J 4 lb $47.50. •K less 2% disc. 10 days. •L F.o.b. Youngstown plant. •M 5,900–9,999#. •N 2,000–19,999#. •O 100 sy lots. •Q 5 tons to CL. •R revised. •S less 2% disc. 10th. •T less ½% disc 10th of mo. •U less 2% disc. 10 days. •V varies according to type and size.

Iron and Steel Products–Base Mill Prices Carlot Quantities

Item	Unit	Birmingham area	Chicago area	Pittsburgh	Buffalo area	Cleveland	Youngstown area	Geneva	Los Angeles	Pueblo
Struct. Shapes	cwt	$5.50	$5.50	$5.50	$5.50	.....	.....	$5.50	$6.20	.....
Plate Carbon Steel	"	5.30	5.30	5.30	5.30	.....	.....	5.30	.....	.....
Reinf. Bars (billet)*	"	5.675	5.675	5.675	5.675	$5.675	$5.675	.....	6.375	.....
Rivets, ½" struct	"	12.25	12.25	12.25	12.25	12.25	.....	.....	.....	.....
Sheet Piling (base)	"	.....	6.50	6.50	6.50	6.50	.....	.....	6.50	.....
Steel Rails, standard	Ton	110.50	110.50	110.50	110.50	.....	.....	.....	.....	.....
light	"	130.00	130.00	130.00	130.00	.....	.....	.....	.....	.....
Track Supplies										
Angle bars	cwt	6.975	6.975	6.975	6.975	.....	.....	.....	.....	$6.975
Std. spikes	"	9.75	9.75	9.75	9.75	.....	9.75	.....	9.75	9.75
Tie plates	"	6.60	6.60	6.60	6.60	.....	.....	.....	6.875	6.60
Track bolts	"	.....	.....	14.75	14.75	14.75	.....	.....	.....	.....

* Fairless Works, $5.225 Revised.

***WROUGHT STEEL PIPE (Full standard weight) Discount from list; see footnote**

Mill	2½ & 3 in.,* Black %	2½ & 3 in.,* Galv. %	3½ to 6 in.,* Black %	3½ to 6 in.,* Galv. %
Lorain, Ohio	13.75	+3.50	+1.75f	+19.50f
Aliquippa, Pa.	13.75	+3.50	3.25a	+14.50a
Sparrows Pt., Md.	17.25	+List	.....	.....
Benwood, W. Va.	13.75	+3.50	.....	.....
Youngstown, O.	13.75	+3.50	3.25	+14.50a
Indiana Harbor, Ind.	12.75	+4.50	2.25ab	+15.50a
Sharon, Pa.	13.75	+2.50	3.25ab	+13.50ab
Wheatland, Pa.	13.75	+3.50	3.25a	+14.50a
Etna, Pa.	13.75	+3.50	.50de	.....
Fontana, Calif.	0.75	+16.50b	+9.75ab	+27.50ab

* Threaded and coupled: a 3½ to 4 in. b to 1, 5 and 6 in. c 6 in. d Seamless 5 in.

WROUGHT STEEL PIPE, butt or continuous weld: Deduct (+) or add (−) these "discounts" from or to the following carlot list prices to get mill prices. Price per ft. (based on approx. $200 per net ton): 2½ in., 58½¢; 3 in., 78½¢; 3½ in., 92¢; 4 in., $1.09; 5 in., $1.48; 6 in., $1.92. Add freight for destination price.

WROUGHT IRON PIPE, lap weld: List prices per ft. same as for wrought steel pipe, but add these "discounts" to get Pittsburgh mill price. 2½ to 3 in., black 106%; galv. 139%; 4 to 6 in., black 103%; galv. 133%. Add freight for destination price.

WELDED FABRIC REINFORCING, FOB Joliet, Ill., Donora, Pa., Monessen, Pa. mill, per 100 sq. ft.: 4 x 19 in., No. 5 & 10 wires....$7.04; 4 x 12 in., No. 8 & 12 wires....$2.62; 6 x 8 in., No. 6 & 6 wires....$4.17

Plumbing, Heating, Water, Sewer Pipe and Tubing

Item	Unit	Atlanta	Baltimore	Birmingham	Boston	Chicago	Cincinnati	Cleveland	Dallas	Denver	Detroit	Kansas City	Los Angeles†#	Minneapolis	New Orleans	New York	Philadelphia	Pittsburgh	St. Louis	San Francisco	Seattle	Montreal	Toronto
C. I. Pipe Price Index	a	130.6	140.2	125.8	143.2	140.0	135.6	141.8	137.9	145.1	142.1	138.6	148.6	145.0	132.4	138.6	137.9	142.9	135.7	148.6	149.0	.....	.....
Asbest. Cem. Pipe, 6" V	lin. ft.	$1.52	$1.61	$1.52	$1.63	$1.48	$1.63	$1.63	$1.63	$1.71	$1.63	$1.49	$1.67	$1.53	$1.61	$1.63	$1.61	$1.63	$1.48	$1.67	$1.71	.....	.....
6" transite pipe V	" "	1.51	1.51	1.51	1.51	1.51	1.51	1.51	1.51	1.59	1.51	1.51	1.59	1.51	1.51	1.51	1.51	1.51	1.51	1.59	1.51	.....	.....
Asbest. Cem. Pipe, 12" W	" "	2.36	2.19	2.26	2.19	2.19	2.19	2.19	2.26	2.36	2.19	2.26	2.19	2.26	2.26	2.19	2.19	2.19	2.26	2.19	2.19	.....	.....
12" transite pipe W	" "	2.48	2.30	2.37	2.30	2.30	2.30	2.30	2.37	2.48	2.30	2.37	2.30	2.37	2.37	2.30	2.30	2.30	2.37	2.30	2.30	.....	.....
Clay Sewer Pipe																							
8 in. ASTMC 13-55	ft.#	0.58r	0.665	0.50r	0.84qrtL	0.93rm	0.59	0.66BCN	0.575#B	0.56nr	0.97nk	0.62r	0.82bl	1.05oB	0.566r	0.94	0.75	0.94K	0.62r	0.86#d	0.88bk	1.13u	0.76F
12 in. "	"	1.14r	1.20	0.95r	1.55qrtL	1.78rm	1.14	1.27tBC	1.09#B	1.00nr	1.86nk	1.125r	1.78blS	1.90oB	1.078r	1.76	1.44#	2.01K	1.23r	1.86#d	1.86kb	2.00u	1.43F
24 in. ASTMC 200-55T	"	4.88r	3.05	4.14rw	6.39qrtM	7.52rm	4.95	8.47tBC	4.75#B	4.98r	7.48nk	6.324br	7.19blS	8.00oB	5.65r	12.89	9.40#v	8.79K	5.10r	7.53#d	7.61k	7.00u	5.70F
36 in. "	"	.....	.....	12.71	13.50rw	.....	21.16rm	14.35	23.45tBC	10.53#bB	19.95nk	16.86r	16.90blS	.....	.....	35.61	25.57#v	24.15K	12.95rS	18.00#d	.....	13.50u	.....
Clay Drain Tile 6 in. V	M ft.	200.00sr	187.80	295.00rx	244.00r	220.00Br	177.50	179.40mBC	.....	460.00nr	212.00mk	315.00r	410.00lS	.....	240.50pr	240.81	230.00#	190.00	180.00r	360.00#l	260.00ck	288.00	175.00F
8 in. V	M ft.	.....	289.20	430.00rx	348.60r	330.00Br	274.60	276.60mBC	.....	640.00nr	327.00mk	625.00r	590.00lS	.....	566.00	369.84	350.00#	295.00	300.00r	620.00#l	135.00	545.00	290.00F
Concrete Sewer Pipe, 12"	ft.#U	0.95mKr	1.01	1.75rS	1.56S	1.30	0.85rA	1.35	1.27BD	1.05m	1.40k	1.68r	1.30vE	2.19DFH	1.41ilR	1.50#B	1.50#h	1.66DB	1.75i	105.00#Q	1.90ky	1.17D	1.27F
24 in.	ft.#U	3.75mKr	2.75	2.75rS	3.60S	4.00	3.25rA	2.40P	2.95BD	3.50m	5.23k	4.20r	3.85fvE	6.31DFH	3.76il	3.60#B	5.50#h	3.33DB	4.05	3.30#Q	4.50ky	3.11jpD	3.19F
Copper Water Tubing																							
3/8", Type L	ft.	0.1438	.....	0.1650	C.1480	0.1480	0.1680	0.1480	.....	0.1680	0.1588	0.1310	0.1480	0.1680	0.1680	0.1480	0.1510	.....	0.1480	0.1480	0.1480	0.2089U	0.3259UV
1/2", Type L	"	0.1670	.....	0.1840	0.1670	0.1670	0.1900	0.1670	.....	0.1900	0.2210	0.1480	0.1670	0.1900	0.1900	0.1670	0.1700	.....	0.1670	0.1670	0.1670	0.2450U	0.3643UV

•† Extra quality. •‡ delivered. •# add 4% sales tax. •a PRICE INDEXES or CENTRIFUGAL CAST IRON PIPE (Include carload freight allowed to city). These also serve as the HISTORICAL RECORD of THE $ PER NET TON PRICE of CLASS B, B&S. PIT CAST IRON PIPE. F.O.B. Foundry Price Indexes Birmingham, Ala., 125.8; Burlington, N. J., 134.6. For explanation of index see ENR Sept. 29, 1955 page 139. •b Extra strength. •c 4-in., $130. •d SS361-A. •f 21 in. •g culvert pipe; reinf., ASTM C 75-56. •h reinf., ASTM C 75-54. •i reinf., ASTM C 76-55. •j centrispun. •k less 2% disc. for cash. •l fob plant. •m truck del. •n LCL del., fob truck. •p less 5% disc. 10th. •p freight allowed to destination in city. •u 35,000# minimum. •r less 2% disc. 10 days. •s 1 ft lengths. •u CSA A 60. •v standard strength. •w SS; add 20% for d.s. •x fob city. •y Reinforced. •z Upper value in range based on both truck lots and less than truck lots, fob city; lower value truck lots delivered. •A single strength. •B truckload. •C less 2% disc. 15th. •D ASTM 76-57. •E less 1% disc. 10 days. •F less 2% disc. 30 days. •G LCL. •H CL. •I fob origin, freight allowed. •J reinf. B14-15. •K Less 2% disc. 15 days. •L ASTM 13-57. •M ASTM 200-57. •N 2 ft lengths. Truckiots. •O add 2% Sales Tax. •P 18 in. •Q less 1% disc. 10th. •R revised. •S ASTMC 72, 12" 1.55, 24" 4.00. •T Second price transite pipe. •U Type K. •V including 11% sales tax, less 20% in lots under 6,000 ft.

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BUILDINGS—LB & CA

▲† **M. A. Gammino Constr. Co.**, 728 Valley St., Providence, R. I., CA **$8,176,000**, Fox Point HURRICANE BARRIER, Providence River, Flood Control Proj., ENG-19-016-61-23, PROVIDENCE, R. I. U. S. Eng., 424 Trapelo Rd., Waltham, Mass. BA 4/11/61. CD 4/13/61, under LB.

MIDDLE ATLANTIC

HEAVY CONSTRUCTION—BA

▲† **Maryland**—BA 5/18—U. S. Eng., 24 St. and Maryland Ave., Baltimore, Zone 18, DREDGING Baltimore Harbor and channels, Baltimore, CIVENG-18-020-61-15. $4,500,000-$5,000,000. CD 9/21/60.

▲ **New York and New Jersey**—BA 6/1—At Office Assistant Ch. Engr. for Design of Authority, Port of New York Auth., Rm. 1115, 111 Eighth Ave., New York 11, N. Y., NORTHBOUND CONNECTION from Henry Hudson Parkway to New York approach to George Washington Bridge, Contr. GWB-190.119. Plans deposit $50. CD 8/15/57.

BUILDINGS—BA

▲ **N. Y., New York**—BA 5/16—New York City Housing Auth., Rm. 1002, 299 Broadway, New York 7, (1) fdns. and general contr., (2) heating and ventilating, (3) electric work, (4) plumbing, Base Bid A (rein.-con. design), and Base Bid B (structural steel design), Proj. No. NYC-36, Mary K. Simkhovitch HOUSES, Henry St., Scammel St., Madison St., Gouverneur St., Water St., Jackson St., Franklin D. Roosevelt Dr. and Montgomery St. $8,000,000. Plans deposit $75. Extended date. Furnishing and installing ELEVATORS at Mary K. Simkhovitch Houses. Plans deposit $25. CD 4/13/61.

▲ **N. Y., New York**—BA 5/23—50 W. 44 St. Bldg. Corp., 50 W. 44 St., New York, Zone 19, 12 story OFFICES ADDN. to 8 story bldg. and alterations. $7,000,000. Kahn & Jacobs, 2 Park Ave., New York, Zone 16, archts. Weiskopf & Pickworth, 230 Park Ave., New York, Zone 17, struct. engrs. Syska & Hennessey, 144 E. 39 St., New York, Zone 16, mech. engrs. CD 2/24/61.

▲ **N Y., New York**—BA 5/23—New York City Housing Auth., Rm. 312, 299 Broadway, New York Zone 7, (1) fdns. and general constr. (2) heating and ventilating (3) electric work and (4) plumbing for Franklin D. Roosevelt HOUSES, Proj. No. NYC-35, E.6 St., Avenue A, E. 2 St. and 1 Ave., Manhattan Boro. Plans deposit $75; furnishing and installation ELEVATORS for Franklin D. Roosevelt Houses. Plans deposit $25. CD 3/5/58.

▲ **N. Y., Brooklyn**—BA 5/24—Diocese of Brooklyn 191 Joralemon St, Zone 2, Nazareth HIGH SCHOOL, Ditmas Ave. and Clarendon Rd., E.57 and 58 Sts. $5,000,000. CD 1/9/61.

▲ **N. J., Elizabeth**—BA On Or About 5/25—St. Elizabeth's Hospital, 204 South Broad St. (selected list of bidders), 5 story HOSPITAL ADDN., South Broad St., $5,363,000. Extended date. Eggers & Higgins, 100 East 42nd St., New York 17, N. Y., archts. CD 12/27/60.

▲ **N. J., Vineland**—BA 5/25—Bd. Educ., Vineland, HIGH SCHOOL. $3,750,000. Ralph E. Hacker, 854 River Rd., New Milford, archt. Beck, Simon & Mantel, 921 Bergen Ave., Jersey City, engrs. CD 4/12/61.

▲ **N. Y., Syracuse**—BA 6/7—State Dpt. P. Wks., State Office Bldg., Albany, TEACHING HOSPITAL, Up State Medical Center. Plans deposit $50. York & Sawyer, 230 Park Ave., New York, Zone 17, archts. Meyer Strong & Jones, 230 Park Ave., New York, Zone 17, mech. engrs. DI Stasio & Van Buren, 136 Liberty St., New York 6, N. Y., struct. engrs.

▲ **N. J., Trenton**—BA 6/15—State Dpt. Purchase & Property, State House, LABOR and INDUSTRY DEPARTMENT BLDG., West State St. $8,000,000. Frank Grad Assoc., 11 Commerce St., Newark, archts. CD 4/12/60.

HEAVY CONSTRUCTION—LB & CA

▲ **NEW YORK**—State Dpt. P. Wks., State Office Bldg., Albany, bids opened 4/27, ROAD,

Grow Constr. Co. Inc., Andrew Catapano Co. Inc. & A. J. Orlando Contg. Co., Inc., 313 W. 53 St., New York 19, N. Y., LB **$9,546,403**, est. $12,589,000, (7 bidders), c. conc. pavement, b. conc., embankment, surcharge, plate girder, comp. beam bridges equestrian underpass, overpass, simple beam, 4 level structure plate girder, 3.83 mi. Interstate Rte. Conn, Clearview Expressway (Hillside Ave. to 73 Ave.) Van Wyck Expressway Extension (57 Ave. to Union Turnpike) Proj. EI 78-1(61) U 1085(19) Contr. FICE 61-1, FAVWE 61-1, Queens Co. (Correction—contractors names). CD 4/28, under LB.

▲ **NEW YORK**—State Dtp. P. Wks., State Office Bldg., Albany, ROAD,

N. Y.—Johnson, Drake & Piper, Inc., 86 Trinity Pl., New York 6, N. Y., CA **$1,269,648**, est. $1,500,000

9 in. c. conc. pavt., 5.03 mi., misc. work 0.11 mi. Orchard Park-East Aurora, SH 1066, Rte. 20A. FARC 61-5, Proj. F-1054(5), Erie Co. CA 4/14/61;

N. Y.—Radory Constr. Corp., 94 Cherry Valley Rd., W. Hempstead, N. Y., CA **$1,228,871**, est. $1,665,000 b. conc. 1.97 mi., misc. work 0.43 mi. traffic signs and signals Jericho Turnpike, SH 9020, Mineola Village, Jericho-Turnpike, SH 1785, Mineola Village-Jericho Turnpike, SH 8493, Mineola Village-Jericho Turnpike, SH 1785A, Rte. 25, FARC 61-31, Proj. U-1000, Nassau Co. CA 4/17;

N. Y.—John Arborio Inc., W. Cedar St., Poughkeepsie, N. Y., CA **$3,832,243**, est. $4,560,000, 9 in. cem. conc. pavt. 5.4 mi. (1.73 acc). 2 HGS comp. I beam, 1 span 78.4 ft. 4 spans 226, 80 ft. total, welded plate gird. br. 2 spans 275 ft. total Kingston By-Pass Pt. 1, Rte. U. S. 209 to Rte. N. Y. 28 (Kingston-West Hurley), SH 5173, Rte. 28 FAS 61-9, FARC 61-32, Proj. F-FG U-395(7), F-1009(5), Ulster Co. Grand total $6,330,762. BA 3/29, CA 4/18. CD 3/30/61, under LB.

BUILDINGS—LB & CA

▲ **Caristo Constr. Corp.**, 26 Court St., Brooklyn 1, N. Y., CA Est. **$5,000,000**, general constr. Bishop Edmund J. Reilly HIGH SCHOOL, Long Island Expressway and Francis Lewis Blvd., BAYSIDE, N. Y. Diocese of Brooklyn, 191 Joralemon St., Brooklyn 2, N. Y. BA 4/24, CA 4/26, CD 3/27/61.

▲ **Turner Constr. Co.**, 150 E. 42 St., New York 17, N. Y., CA Est. **$3,000,000**, 4 story, 110,000 sq. ft. OFFICE, Merrick Rd. and South Nieman Ave., LYNBROOK, N. Y. Liberty Mutual Insurance Co., 381 Sunrise Highway, Lynbrook, N. Y. Perry, Shaw, Hepburn & Dean, 31 James St., Boston, Mass., archts.

▲ **Bailey Constr. Corp.**, 1581 Irving Pl., Woodmere, N. Y., CA Est. **$3,393,000**, 2 story, 188 unit Orloff Towers APARTMENT, NEW YORK, N. Y. Uniformed Firemen's Assoc. of Greater New York, 38 Park Row, New York 38, N. Y. CD 3/30/61.

▲ **S. S. Silberblatt, Inc.**, 25 West 45 St., New York 19, N. Y., LB **$5,775,000**, (7 bidders), fdns. and general constr. Rutgers HOUSES, Proj. No. NYS-80, Madison St., Rutgers St., Cherry St. and Pike St., NEW YORK, N. Y. New York City HOUSING Auth., Rm. 312, 299 Broadway, New York 7, N. Y. BA 4/27, CD 4/13/61;

Sam Berley Heating Corp., 112 DeKalb Ave., Brooklyn 1, N. Y., LB **$475,000**, (4 bidders), heating and ventilating, Rutgers HOUSES (New York, N.Y.);

Arc Electrical Constr. Co., Inc., 739 Second Ave., New York 16, N. Y., LB **$478,000**, (5 bidders), electrical work Rutgers HOUSES (New York, N. Y.);

Lipsky & Rosenthal, Inc., 112 St. and Madison Ave., New York 29, N. Y., LB **$857,000**, (6 bidders), plumbing, Rutgers HOUSES (New York, N. Y.);

Armor Elevator Co., Inc., 35-45 35 St., Long Island City 6, N. Y., LB **$416,522**, (5 bidders), elevators, Rutgers HOUSES (New York, N. Y.).

▲ **Vermilya-Brown Co., Inc.**, 100 E. 42 St., New York 17, N. Y., CA Est. **$4,059,230**, 20 story, 218 unit Inwood Gardens APARTMENT, northside Fairview Ave. west of St. Nicholas Ave., NEW YORK, N. Y. Inwood Gardens, c/o contractor. CD 4/10/61.

▲ **Wilaka Constr. Co., Inc.**, 11 E. 44 St., New York 17, N. Y., CA **$4,344,000**. Combination Bid, general contract only PUBLIC SCHOOL 111, Baychester and Crawford Aves. and PUBLIC SCHOOL 133, Stebbins Ave., Rogers Pl., Westchester Ave. and E. 64 St., Bronx Boro, NEW YORK, N. Y. Deputy Supt. Schools, Bureau Constr., 42-15 Crescent St., 4 Floor, Long Island City 1, N. Y. BA 12/15, CA 4/27. CD 12/60. under LB.

▲ **D. Fortunato, Inc.**, 11 Garfield Ave., Floral Park, N. Y., LB **$3,839,000**, LIBRARY, PHYSICS BLDG., BIOLOGY BLDG., State University College on Long Island, STONY BROOK, N. Y. State Dpt. P. Wks., State Office Bldg., Albany, N. Y. BA 5/3. CD 4/25/61.

▲ **Shore Assocs.**, c/o Tito P. Di Vincenzo, archt., 136 East 57th St., New York, N. Y., Owner Builds, **$4,000,000-$5,000,000**, 1-15 story APARTMENT, ASBURY PARK, N. J. Joseph R. Loring & Assocs., 25 West 45th St., New York 26, N. Y., mech. engrs. De Stasio & Van Buren, 136 Liberty St., New York 6, N. Y., struc. engrs. CD 3/6/61.

▲ **Barclay Farms**, Rte. 70, Haddonfield, N. J., Owner Builds, **$10,000,000**, 600 unit RESIDENTIAL DEVELOPMENT, Brace St., etc., ERLTON, N. J. Lester H. Weckesser, 19 Montana Ave., Erlton, N. J., archt.

▲ **Charles Hild Realty Co.**, 5043 Frankford Ave., Phila., Pa., Owner Builds, **$3,000,000**, RESIDENTIAL DEVELOPMENT (225), Middletown Twp., Bradley Tract, LEVITTOWN, PA.

▲† **Community Builders, Inc.**, 1730 K St. N.W., Wash., D. C., LB **$5,218,000**, (8 bidders), 400 units CAPEHART HOUSING, Unit 2, ENG-18-020-61-22, FORT GEORGE G. MEADE, MD. U. S. Eng., 24 St. and Maryland Ave., Baltimore, Md. BA 4/27. CD 4/14/61.

SOUTH

HEAVY CONSTRUCTION—BA

▲ **Virginia**—BA 6/7—Elizabeth River Tunnel Comn., City Hall, 235 Plume St., Norfolk, Contr. 5, Second Elizabeth River Tunnel and Approaches, TOLL PLAZA and BUILDINGS. Plans deposit $35. Parsons, Brinckerhoff, Quade & Douglas, 165 Broadway, New York 6, N. Y., engrs. CD 11/25/59.

BUILDINGS—BA

▲† **Ala., Fort Rucker**—BA 5/24—U. S. Eng., P.O. Box 1169, Mobile, 498 units CAPEHART HOUSING, ENG-01-076-61-708, approx. $8,000,000. Pearson, Tittle & Narrow, 409 1st National Bank Bldg., Montgomery, archts. Extended date. CD 3/21.

HEAVY CONSTRUCTION—LB & CA

▲† **Humphreys & Harding, Inc.**, 1608 New Hampshire Ave. N. W., Wash., D. C., LB **$7,934,500** (4 bidders), interior finishing and completion TERMINAL BLDG., Dulles International Airport, CHANTILLY, VA. Federal Aviation Agency, 16th and Constitution Ave. N. W., Wash., D. C. BA 4/27/61. CD 4/761.

▲† **Aerojet General Co.**, 6352 N. Irwindale Ave., Covina, Calif., CA **$4,500,000**, SATURN TEST FACILITY, George C. Marshall Space Flight Center, HUNTSVILLE, ALA. U. S. Eng., 301 Grant St., Mobile, Ala. CD 8/19/60.

▲ **LOUISIANA**—State Dpt. Hys., Rm. 426, Headquarters Admin. Bldg., Baton Rouge, Bids opened 4/26, BRIDGE,

Massman Constr. Co., 3917 Broadway, Kansas City, Mo., LB **$4,539,949**, hydraulic embankment, bridge structure 0.844 mi. Lake Charles Interstate Hy. By-Pass (Calcasieu River Bridge-East approach), Rte. I-210. SP 450-30-05 FAP No. 1-210-1(39)27, Calcasieu Parish. CD 4/6/61.

▲ **LOUISIANA**—State Dpt. Hys., Rm. 426, Headquarters Admin. Bldg., Baton Rouge, Bids opened 4/26, ROADS,

Campbell Constr. Co., foot of Milam St., Shreveport, La., LB **$3,233,950**, c. conc. pavt. 6.334 mi. Ada-Arcadia Hy., Rte. I 20. SP No. 451-04-04 FAP No. I-20-2(13)61, Bienville, Parish; LB **$1,033,564**, grading, drainage structures, c. conc pavt. 3.028 mi. Carencro-Sunset Hy., Rte. LA 3052 SP Nos. 424-02-13 and 424-01-66, FAP No. F-65(12), Lafayette and St. Landry Parishes. CD 4/6/61.

▲ **LOUISIANA**—State Dpt. Hys., Rm. 426, Headquarters Admin. Bldg., Baton Rouge, Bids opened 4/26, ROADS,

La.—**Campbell Constr. Co.**, foot of Milam St., Shreveport, La., LB **$3,714,984**, c. conc. pavt. 6.744 mi. Ada-Arcadia Hy. (Ada-Gibsland) Rte. I-20. SP 451-04-03 FAP 1-20-2-12-54, Bienville Parish. CD 4/6;

La.—**Philip R. Farnsworth & Co.**, 1515 S. Salcedo, New Orleans, La., LB **$3,825,820**, c. conc. pavt. Monroe Interstate Hy., Rte. I-20, SP No. 451-06-07 FAP No. 1-20-3(12)115, Ouachita Parish, CD 4/6; CD 4/12/61.

BUILDINGS—LB & CA

▲ **A. B. Newton & Co.**, P.O. Box 191, Vidalia, Ga., LB **$4,670,000**, (14 bidders), 450-unit Low Rent HOUSING and MANAGEMENT BLDG., Proj. VA-7-8, RICHMOND, VA. Richmond Redevelopment & Housing Auth., 100 East Main St., Richmond, Va. BA 5/4/61. CD 4/7/61.

▲† **T. A. Loving & Co.**, and **Harllee-Quettlebaum Constr. Co.**, P.O. Box 1291, Goldsboro, N. C. CA **$6,200,000**, completing 800 units CAPEHART HOUSING, Marine Corps Base, CAMP LEJEUNE N. C. Dpt. P. Wks. Office, 5th Naval Dist., Norfolk, Va. CD 3/7/61.

▲† **Thompson & Street**, Clanton Rd., and **Blythe Co.**, 2911 Graham St., Charlotte, N. C., CA **$7,132,600**, 500 units, CAPEHART HOUSING, U. S Naval Base, NBy-34594, CHARLESTON, S.C. Dist. P. Wks. Office, 6th Naval Dist., Charleston, S. C. BA 3/30/61. CD 4/4/61, under LB.

▲ **Fred Howland, Inc.**, 1451 NW 20th St., Miami, Fla., CA **$3,318,300**, East Ridge RETIREMENT VILLAGE, MIAMI, FLA., The Lutheran Senior Citizens Foundations, Inc., Holy Cross Lutheran Church, 650 NE 135th St., North Miami, Fla., CD 4/24/61, under LB.

▲ **Robert E. McKee Contractor, Inc.**, 2708 Inwood Rd., Dallas, Tex., CA **$5,892,110**, 9 story Hutchison MEMORIAL BLDG. ADDN., NEW ORLEANS, LA. Tulane University, 6823 St. Charles Ave., New Orleans, La. BA 12/15. CD 12/20/60, under LB.

▲† **Tenn., Memphis** — Veterans Admin., Vermont Ave. between H and I Sts. N.W., Wash. 25, D. C., VETERANS HOSPITAL. (Correction—All information on this report refers to Veterans Hospital in Washington, D. C., Memphis project in abeyance). CD 4/27/61.

MIDDLE WEST

HEAVY CONSTRUCTION—BA

▲ **Ohio**—BA 5/23—Dpt. Natural Resources, Div. Water, 1562 W. 1st Ave., Columbus, Zone 12, PRIMARY SPILLWAY, INTAKE WORKS, DISCHARGE CARRIER, TUNNEL and STILLING BASIN for Salt Fork Dam, Guernsey Co., Liberty Twp., U.S. Rte. 21, approx. 6 mi. north of Cambridge. Plans deposit $25. Burgess

& Niple, 2015 W. 5th Ave., Columbus, consult. engrs. CD 10/20/58.

HEAVY CONSTRUCTION—LB & CA

▲ **OHIO**—State Hy. Comn., State Depts., Bldg., Columbus, Zone 15, Bids opened 4/25, ROADS,
O.—**Bates & Rogers Constr. Co.**, 600 W. Jackson Blvd., Chicago, Ill., LB **$1,056,486**, est. $1,224,700 (6 bidders), Type T 35 on B 19 and structure 1.465 mi. State Rte. 528-1.24, S 34(4). Proj. 197, Lake Co.; LB **$844,349**, est. $1,005,600 (15 bidders), Type T 35 on B 19 and structure 0.567 mi. US Rte. 25-7.12, I 75-1(45)46, Proj. 203, Montgomery Co.:
O.—**Frank Mashuda Companies, Associated**, 5556 W. Roosevelt Dr., Milwaukee, Wis., LB **$3,187,253**, est. $3,795,400 (6 bidders), Type Part 1-T-71 and structure Type Part 2-T-71 and structure 3.944 mi. US Rte. 40-5.58, 5.84 (parts Nos. 1 and 2) Part 1-S-SG-1338(1) Pt. 2-I 70-7(8)177, Proj. 196, Guernsey Co. CD 3/30/61.

▲† **North East Constr. Co.**, 323-8th St., Parkersburg, W. Va., LB **$3,478,092**, (7 bidders), WHERRY HOUSING, Wright Patterson Air Force Base, DAYTON, O. Procurement Officer, Wright Patterson Air Force Base, Dayton, O. BA 4/17/61. CD 3/27/61.

BUILDINGS—LB & CA

▲ **Fred Berglund & Son, Inc.**, 8410 S. Chicago Ave., Chicago, Ill., CA **$3,500,000**, CONTINUING EDUCATION CENTER, 60 and Kimbark Sts., CHICAGO, ILL. University of Chicago, 5801 S. Ellis Ave., Chicago, Ill. BA 12/8/60. CD 12/7/60.

▲ **Ladd Enterprises, Inc.**, 925 Rand Rd., Des Plaines, Ill. Owner Builds **$13,000,000**, 648 unit HOUSING, US 41, CRYSTAL LAKE, ILL.

▲ **Darin & Armstrong, Inc.**, 2041 Fenkell St, Detroit, Mich. CA Est. **$4,500,000**, three 1 story, 129,180 ft. EDIBLE OIL PROCESSING PLANT buildings, KANKAKEE, ILL. Armour & Co., 400 N. Wabash Ave., and P. O. Box 9222, Chicago 90, Ill. BA 4/7/61, CA 4/26/61. CD 3/28/61.

▲ **J. H. Findorff & Sons, Inc.**, 601 W. Wilson St., Madison, Wis., LB **$4,582,407**, general contract, HILL STATE FARMS, Buildings A, B, C and D, MADISON, WIS. State Public Buildings Corp., Capitol Bldg., Madison, Wis., BA 4/27/61, CD 3/31/61;
H & H Electric Co., Inc. and Robert J. Nickles, Inc., 2704 Royal St., Madison, Wis. LB **$1,309,738**, electrical contract for HILL FARMS STATE OFFICE (Madison, Wis.);
H.P.H. Assocs., 2030 Pennsylvania Ave., Madison, Wis., LB **$890,000**, heating contract for HILL FARMS STATE OFFICE, (Madison, Wis.);
Iowa Sheet Metal Contractors, Inc., 2601 Bell St., Des Moines, Iowa., LB **$858,500** ventilating contract for HILL FARMS STATE OFFICE (Madison, Wis.).

MISSISSIPPI TO ROCKIES

HEAVY CONSTRUCTION—BA

▲† **Kan., Wichita**—BA On Or About 6/8—Director, Titan II Constr. Directorate, Corps of Engineers, Ballistic Missile Constr. Office, Air Force Unit P. O., Los Angeles 45, Calif., Titan II, Phase II, CONCRETE WORK, EARTHWORK, paving, metal arch cableway, metal silo doors and appurtenances, metal platforms, interior and exterior electrical sys., domestic and fire water sys., security fencing; installation government-furnished equipment consisting hydraulic and pneumatic sys., pumps and valves for water sys., heating, ventilating and air conditioning equipment, standby power generators and fire detection and alarm devices, etc., eighteen separate Complexes near McConnell Air Force Base, IFB ENG-04-548-61-37B. Over $10,000,000. Plans deposit $10. Bidders must prequalify. CD 4/27/60.

BUILDINGS—BA

▲† **Mont., Fort Harrison**—BA 6/13—Veterans Administration, Munitions Bldg., Wash., 25, D.C., 4 story, 98,694 sq. ft. HOSPITAL. $5,400,000. Page & Werner, Box 1382, Great Falls, Mont. and Ellerbe & Co., 333 Sibley St., St. Paul, Minn., assoc. archts.-engrs. CD 9/13/60.

▲ **Colo., Denver**—BA 5/23—University of Denver, Evans & University, 2 RESIDENT HALLS, DINING FACILITIES. $3,686,420. Extended date. Perkins & Will, 309 W. Jackson Blvd., Chicago, Ill., archts. CD 3/27/61.

BUILDINGS—SLC

▲ **Minn., St. Paul**—Webb Publishing Co., 58 East 10 St., soon lets contract PLANT, W. 7 St. and Lexington Parkway. $4,000,000. C. T. Main, Inc., 80 Federal St., Boston, Mass., engr. CD 12/12/60.

HEAVY CONSTRUCTION—LB & CA

▲ **Harmon Constr. Co.**, Box 1414, Oklahoma City, Okla., CA **$5,531,788**, AERO MEDICAL RESEARCH FACILITIES, OKLAHOMA CITY, OKLA. Oklahoma City Airport Trust Auth., First National Bldg., Oklahoma City 2, Okla. BA 4/19/61, CA 4/27/61. CD 4/24/61, under LB.

▲† **Utah Construction & Mining Co.**, 550 California St., San Francisco, Calif., LB Schedule 1, (12 month completion) **$5,918,221**, est. $8,127,843, LB Schedule 2, (14 month) **$5,862,734**, est. $7,732,228, (13 bidders) UNDERGROUND CONTROL CENTER of North American Air Defense Command (NORAD) ENG-25-066-61-41, COLORADO SPRINGS, COLO. U. S. Eng., 215 N. 17th St., Omaha 2, Neb., BA 5/2/61 CD 4/25/61.

BUILDINGS—LB & CA

▲ **Nagle-Leck, Inc** 714 Baker Bldg., Minneapolis, Minn., CA Est. $4,000,000, 6 story BANK ADDN. atop existing 5 story wing, MINNEAPOLIS, MINN. Farmers & Mechanics Savings Bank of Minneapolis, 90 South 6 St., Minneapolis, Minn. McEnary & Krafft, 1420 Soo Line Bldg., Minneapolis, Minn., archts. CD 5/3/61.

FAR WEST

BUILDINGS—BA

▲† **Calif., Point Mugu**—BA 6/1—11th Naval Dist. P. Wks., 1220 Pacific Hy., San Diego, Zone 1, 200 units CAPEHART HOUSING; 192 units, Naval Missile Center, Point Mugu; 8 units at Point Hueneme, Spec. 36874. Hugh Gibbs, 441 E. First St., Long Beach, archt. CD 3/13/61.

HEAVY CONSTRUCTION—LB & CA

▲ **Denver & Rio Grande Railroad Co.**, 1531 Stout St., Denver, Colo., Owner Builds, Est. **$6,000,000**, 39 mi. RAILROAD SPUR from Brendel to Cane Creek, Grand Co., UTAH. CD 2/1/61.

▲ **Mountain Fuel Supply Co. & Utah Natural Gas Co.**, 180 E. 1st South, Salt Lake City 11, Utah. Owners Build, **$10,000,000**, 103 mi. 20 in. NATURAL GAS PIPE LINE from Uintah Co. to Carbon Co., UTAH. CD 7/1/55.

▲† **Matt J. Zaich Co.**, 6828 Farmdale Ave., North Hollywood, Calif., LB **$4,396,821**, est. $4,205,071 (5 bidders) Benedict Canyon CHANNEL, Cattaraugus Ave. to Ballona Creek, Los Angeles County Drainage Area, CIVENG-04-353-61-20B, CALIFORNIA. U. S. Eng., 751 S. Figueroa St., Los Angeles, Calif. BA 4/26. CD 4/3/61.

BUILDINGS—LB & CA

▲ **Andersen-Westfall Co.**, 3427 N.E. Halsey St., Portland, Ore., CA **$6,368,054**, 17 story OFFICE, PORTLAND, ORE. Standard Insurance Co., Standard Insurance Bldg., Portland, Ore. BA 3/16/61, CA 4/28/61. CD 3/22/61, under LB.

▲ **J. B. Allen & Co.**, 36 East Mason St., Santa Barbara, Calif., CA **$3,748,000**, HEATING PLANT and LABORATORY "B", University of Calif., University City, LAJOLLA, CALIF. University of California, Bd. Regents, General Service Bldg., Scripps Institute of Oceanography, LaJolla, Calif. BA 4/6, CA 4/26. CD 4/11/61, under LB.

▲ **Carter Co.**, 12795 Wilshire Blvd., Los Angeles, Calif., CA Est. **$5,000,000**, 9 story, steel frame and rein.-con. OFFICE, 2795 Wilshire Blvd., LOS ANGELES, CALIF. U. S. Borax & Chemical Corp., 630 Shatto Pl., Los Angeles, Calif. Welton Becket & Assoc., 10,000 Santa Monica Blvd., Los Angeles, Calif. archts. CA Apr. 1961.

▲ **Robert E. McKee**, 4701 San Fernando Rd., Los Angeles, Calif., LB **$4,999,600** (9 bidders), OUTPATIENTS BLDG., Los Angeles County General Hospital, LOS ANGELES, CALIF. Los Angeles Co., 501 Hall of Records, Los Angeles, Calif. BA 5/3. CD 3/24/61.

▲ **Gust K. Newberg Constr. Co.**, 600 S. Lafayette Park Pl., Los Angeles, Calif., CA **$11,174,500**, Men's DETENTION CENTER, 411 Bauchet St., Proj. 2091, LOS ANGELES, CALIF. Bd. Supervs. Los Angeles Co., 500 W. Temple St., Los Angeles, Calif. BA 3/8, CA 4/25. CD 3/14/61, under LB;
Decatur Iron & Steel Co., Decatur, Ala., CA **$2,450,000**, PRISON EQUIPMENT for Men's Detention Center (Los Angeles, Calif.).

▲ **Bechtel Corp.**, 220 Bush St., San Francisco, Calif., CA Est. over **$20,000,000**, ISOCRACKING PLANT at Avon Refinery, MARTINEZ, CALIF. Tidewater Oil Co., 79 Montgomery St., San Francisco, Calif.

▲ **Belle Haven Realty Co.**, 1420 East 3 Ave., San Mateo, Calif., Owner Builds, **$4,500,000** 24 story, steel frame, concrete, rein.-con. The Royal TOWERS APARTMENTS, SAN FRANCISCO, CALIF. Barbachano, Ivanitsky & Watanabe, 11484 San Pablo Ave., El Cerrito, Calif., archts. Chin & Hensolt, 121 2nd St., San Francisco, Calif., engrs. CD 2/25/60.

▲ **Pacific Coast Builders**, 1 South Park St., San Francisco, Calif., LB **$3,477,777** (3 bidders), 328 units Hayes Valley HOUSING, 4 sites, Proj. CAL 1-18(7), SAN FRANCISCO, CALIF. City and San Francisco County Housing Auth., 440 Turk St., San Francisco, Calif. BA 4/27. CD 4/21/61.

▲ **Diverco Constructors**, 10238 Lakewood Blvd., Downey, Calif., LB **$4,590,000**, (7 bidders), 5 story ACUTE DISEASES UNIT ADDN., County Hospital, Orange, SANTA ANA, CALIF. Bd. Supervs. Orange Co., Court House, Santa Ana, Calif. William Falkner, Spurgeon Bldg., Santa Ana, Calif. archt. BA 4/26. CD 9/9/60, under LB.

CANADA

BUILDINGS—BA

▲ **Sask., Saskatoon**—BA 5/26—Bd. Governors St. Pauls Hospital, HOSPITAL. $6,000,000. Green, Blankstein, Russell & Assocs., 222 Osborne St. N, Winnipeg, Man., archts. CD 5/2/60.

LATIN AMERICA

HEAVY CONSTRUCTION—BA

▲ **Honduras**—BA 5/31—Empresa Nacional de Energia Electrica, Apartado Postal 99, Tegucigalpa, D. C., Honduras, First Phase Canaveral HYDRO-ELECTRIC Proj. near Lake Yojoa. Harza Engr. Co., 400 W. Madison St., Chicago 6, Ill., U.S.A., engr. CD 2/6/61.

AMERICANS ABROAD

BUILDINGS—LB & CA

▲ **Dorr Oliver, Inc.**, Havermyer Lane, Stamford, Conn., U.S.A., CA 150,000 ton annual capacity PHOSPHORIC-ACID PLANT, SAFI, MOROCCO. Govt. of Morocco, Rabat, Morocco;
400,000 ton SULFURICACID PLANT to Lurgi, German Firm and 200,000 ton TRIPLE SUPERPHOSPHATE PLANT to Krebbs, French Firm. Total cost **$50,000,000**. CD 5/6/60.

▲ **Fluor Corp. Ltd.**, 2500 S. Atlantic Blvd., Los Angeles 22, Calif., U.S.A., CA Over **$15,000,000**, STEAM CRACKING PLANT, STENUNGSUND, SWEDEN. Svenska Esso, B. A., 55 Nybrogatan St., Stockholm 5, Sweden. (Affiliate Standard Oil of New Jersey, 15 W. 51 St., New York, N. Y., U.S.A.) Fluor Engineering & Constr. Co., Ltd., English subsidiary contractor. CD 1/6/61.

FOREIGN

HEAVY CONSTRUCTION—LB & CA

▲ **Christiani-Nielsen**, Copenhagen, Denmark, and Gammon (Malaya 1959 Ltd., Singapore), CA East. **$4,500,000** reconstr. King's WHARF and other harbor works, SUVA, FIJI ISLANDS.

BUILDINGS—LB & CA

▲ **J. Gerrard & Sons Ltd.**, Swinton, Lancashire, England, CA **$7,204,400**, ABATTOIR and MEAT MARKET, Philips Park, MANCHESTER, ENGLAND. Manchester Corp., Town Hall, Albert Sq., Manchester, England Leonard C. Howitt, c/o owner, city archt. Matthews & Mumby Ltd., Oldham St., Manchester, England, engrs.

PROPOSED PROJECTS

WATER SUPPLY

▲ **Ariz., Phoenix**—City, City Hall, **$33,000,000**, bond election May 23, WATERWORKS EXTENSIONS. CD 5/28/57.

SEWERS, WASTE DISPOSAL

▲ **Ariz., Phoenix**—City, City Hall, **$33,000,000** bond election May 23, SANITARY and STORM SEWERS, CD 5/28/57.

▲ **N. J., Ridgewood**—Northwest Bergen County Sewer Auth., c/o Russell MacFall, 4 Franklin Ave., TRUNK SEWERAGE SYSTEM, incl. treatment plant for Ramsey, Allendale, Waldwick, Hohokus, Midland Park and Wyckoff. City of Ridgewood has withdrawn from project and treatment plant will be located at Waldwick. **$13,522,000**, (cost reduced). Havens & Emerson, 233 Broadway, New York, N. Y., consult. engrs. CD 5/11/60.

BRIDGES

▲ **OREGON and WASHINGTON**—Oregon State Hy. Comn., Hy. Bldg., Salem, Ore., and Washington State Hy. Comn., Transportation Bldg., Olympia, Wash., BRIDGE, 4.1 mi. highway bridge across Columbia River from Astoria, Ore., to Megler, Wash. **$24,000,000**. Bids in Fall 1961. CD 11/7/56.

STREETS AND ROADS

▲ **PENNSYLVANIA**—State Hy. Dpt., 506 North Office Bldg., Harrisburg, ROAD,
Butler and Lawrence Counties—9 mi. sect. Erie-Pittsburgh Freeway, Interstate 79, between point near Portersville, Butler Co., to near Elliot Mills, Lawrence Co. **$9,000,000**. Swindell-Dressler Corp., P.O. Box 1888, Pittsburgh, consult. engrs. CD 11/17/58.

▲ **PENNSYLVANIA**—State Hy. Dpt., 506 North Office Bldg., Harrisburg, ROAD,
Venango Co.—10.7 mi. sect. Keystone Shortway, Interstate 80 between point one-half mile east of T.R. 8, north of Barkleyville and point ¾ mi. east of L.R. 60009, 1½ mi. east of Lisbon, **$10,000,000**. Rummel, Klepper & Kahl, Park Place Office Bldg., Camp Hill, consult. engrs. CD 7/23/58.
6 mi. sect. Keystone Shortway, Interstate 80, between point 1½ mi. east of Lisbon and point ¼ mi. south of intersection with T.R. 38, **$12,000,000**. Buchart Engineering Corp., York, consult. engrs.

EARTHWORK, WATERWAYS

▲ **Calif., San Francisco**—City and San Francisco County, City Hall, plans by Bechtel Corp., 612 South Flower St., Los Angeles, Zone 17, Don Pedro DAM, Tuolumne River, Stanislaus Co. **$75,000,000**. CD 3/12/56.

AIRPORTS

▲ **Ariz., Phoenix**—City, City Hall, **$14,200,000** bond election May 23, Sky Harbor AIRPORT EXPANSION, CD 5/28/57.

▲ **O., Cleveland**—City, City Hall, Zone 17, CARGO TERMINAL, Cleveland Hopkins Airport, **$5,000,000**. CD 3/14/52.

UNCLASSIFIED

▲ **Ariz., Phoenix**—City, City Hall, **$6,100,000** bond election May 23, PARKS and PLAYGROUNDS. CD 5/28/57.

PUBLIC BUILDINGS

▲ **Calif., Los Angeles**—Los Angeles County, 500 W. Temple St., plans by Kenneth S. Wing & William

Allen, 30 Linden Ave., Long Beach, Calif., San Fernando Valley Branch JUVENILE HALL, Sylmar. **$4,000,000.** CD 1/9/56.

▲ **Ga., Georgetown**—Quitman County, Courthouse, IRON-STEEL MILL by direct reduction process, **$30,000,000,** 1st phase. Koppers Co., Engineering & Construction Div., Koppers Bldg., Pittsburgh, Pa., consult. engrs. Group of Georgia and Texas operators, lessee.

▲ **N. Y., Jamaica**—Dpt. P. Wks., Municipal Bldg., New York, Zone 7, plans by Kiff, Colean, Voss & Souder and York & Sawyer Assoc. Archts., 230 Park Ave., New York 17, N. Y., Proj. L-39, CENTRAL BLDG., Queens Boro Public Library, Merrick Blvd., 89-90 Aves., Queens Boro. **$6,000,000.** To go ahead after 1961. CD 11/18/57.

▲ **N. Y., New York**—New York City Housing Auth., 299 Broadway, Zone 7, Proj. NY 5-63, one 24 story and one 18 story 294 unit APARTMENTS, East 27 to East 28 Sts. between 2nd and 3 Aves. **$4,570,000.**

▲ **Utah, Salt Lake City**—Granite School Dist., 3250 E. 3760 South, **$9,800,000** bond election May 23, SCHOOLS. CD 5/17/60.

COMMERCIAL BUILDINGS

▲ **Calif., San Francisco**—Webb & Knapp, 220 Montgomery St., plans by Welton Becket & Assocs., 153 Maiden Lane, 20 story APARTMENT and 22 TOWN HOUSES, Russian Hill. **$10,000,000.**

▲ **Mich., Ann Arbor**—Lutheran Church-Missouri Synod, 210 N. Broadway, St. Louis 2, Mo., plans by Vincent G. Kling, 917 Corinthian Ave., Phila. 30, Pa., JUNIOR COLLEGE, Phase No. 1, US Hy. 24 and Geddes Rd. **$5,000,000.** Bids late 1961. CD 3/28/61.

▲ **N. Y., New York**—Allstate Outlet Stores Corp., c/o Brett, Wyckoff, Potter, Hamilton, Inc., 15 E. 47 St., Zone 17, plans by A. H. Salkowitz, 87-25 Homelawn St., Jamaica, 250,000 sq. ft. Bronxeast SHOPPING CENTER, Bruckner Expressway and White Plains Rd. **$5,000,000.** Constr. late 1961 or early 1962. CD 8/26/59.

▲ **N. Y., New York**—Grove Holding Corp., 16 Court St., Brooklyn, Zone 1, plans by Philip Birnbaum, 12 E. 48 St., Zone 17, 13 story, 189 unit, 70 x 145 ft. APARTMENT, 208-218 E. 15 St. **$3,500,000.** CD 9/16/60.

▲ **N. Y., New York**—June Homes, Inc., 1200 Union Turnpike, New Hyde Park, plans by Philip Birnbaum, 12 E. 48 St., New York 17, N. Y., 30 story APARTMENT with 12 story bldg. on each side, 500-516 E. 77 St. **$4,500,000.** Farkas & Barron, 5 Beekman St., Zone 38, struct. engrs. M. P. Zacharius & Assocs., 34 W. 34 St., Zone 1, mech. engrs. CD 12/13/60.

▲ **N. Y., New York**—New York University, 100 Washington Square, New York, Zone 12,
WASHINGTON SQUARE CENTER
Brown and Waverly LABORATORIES ALTERATIONS, **$2,000,000.**
ADMINISTRATIVE and ALUMNI HEADQUARTERS, **$2,000,000.**
LAW CENTER LIBRARY, **$750,000.**
MAIN LIBRARY ADDN. **$3,000,000.**
UNIVERSITY HEIGHTS CENTER
UNIVERSITY COLLEGE HALL, CLASSROOM and ADMINISTRATION BLDG., **$3,750,000.**
TECHNOLOGICAL BLDG., **$3,200,000.**
RESEARCH LABORATORY, **$2,000,000.**
Hall of Fame LIBRARY ALTERATIONS, **$1,000,000.**
renovation Gould Hall and Nichols CHEMISTRY BLDG. and other imprvs., **$1,050,000.**
Guggenheim SCHOOL OF AERONAUTICS ALTERATIONS, **$750,000.**
WALL STREET CENTER
LIBRARY and RESEARCH CENTER, GRADUATE SCHOOL of BUSINESS ADMINISTRATION, Trinity Place, adjacent to Nichols Hall, **$4,400,000.** Constr. after 1961. CD 1010/52.

▲ **N. Y., New York**—Ulster Holding Corp., 16 Court St., Brooklyn, Zone 2, plans by Philip Birnbaum, 12 E. 48 St., Zone 17, 19 story, 240 unit APARTMENT, 1652-58 First Ave. and 401-17 E. 86th St. **$6,000,000.** To go ahead 1961. CD 10/23/59.

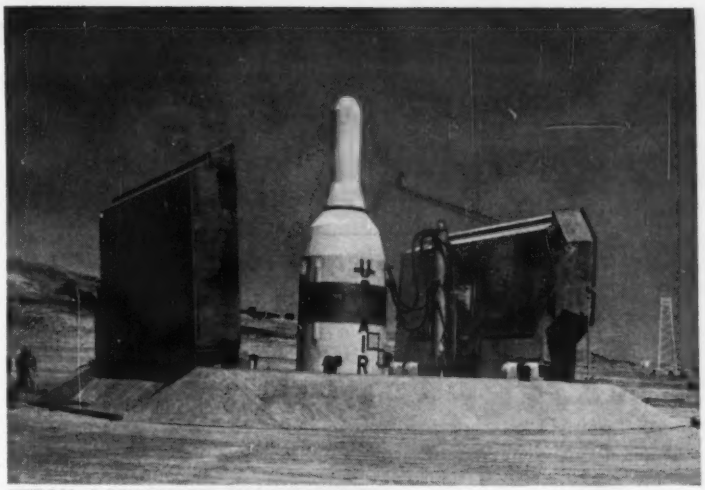
▲ **N. Y., New York**—Godfrey M. Weinstein & Co., Inc., 328 E. 48 St., Zone 17, plans by Wm. T. Meyer, 407 E. 55 St., Zone 22, N. Y., 360 unit APARTMENT DEVELOPMENT, Bruckner Parkway and White Plains Rd. **$5,000,000-$6,000,000.** Constr. 1963. CD 8/26/59, under Allstate Outlet Stores Corp. as Owner.

▲ **N. Y., Patchogue**—Suffolk Development Corp., 185 Jennings Ave., 300,000 sq. ft. SHOPPING CENTER, 6 story OFFICE, THEATRE, BOWLING CENTER, parking area, 18 acres, East Main St. between Grove and Evergreen Aves. **$5,000,000.**

▲ **Que., Montreal**—Societa Generale Immobiliare of Italy, c/o A. Mian and M. DeLeva, 1420 Sherbrooke St. W., plans by Professor Moretti, Rome, Italy, prestressed concrete OFFICES and PLAZA DEVELOPMENT, incl. 35 story, 100 x 225 ft. OFFICE, 10 story OFFICE and 2 story, glass enclosed head OFFICE for Mercantile Bank of Canada, west of Victoria Square, between St. James and Craig Sts. **$50,000,000.** Greenspoon, Freedlander & Dunne, 4151 Sherbrooke St. W., Montreal, assoc. archts. Pier Luigi Nervi & Sons, Rome, Italy, consult. engrs.

PUERTO RICO

▲ **Puerto Rico, San Juan**—Lowe's Theaters, Inc., 1540 Broadway, New York, N. Y., plans by Morris Lapidus, 256 E. 49 St., New York, N. Y., 16 story, 450 room The Americana HOTEL, swimming pool. **$13,000,000.** Groundbreaking June 1961.



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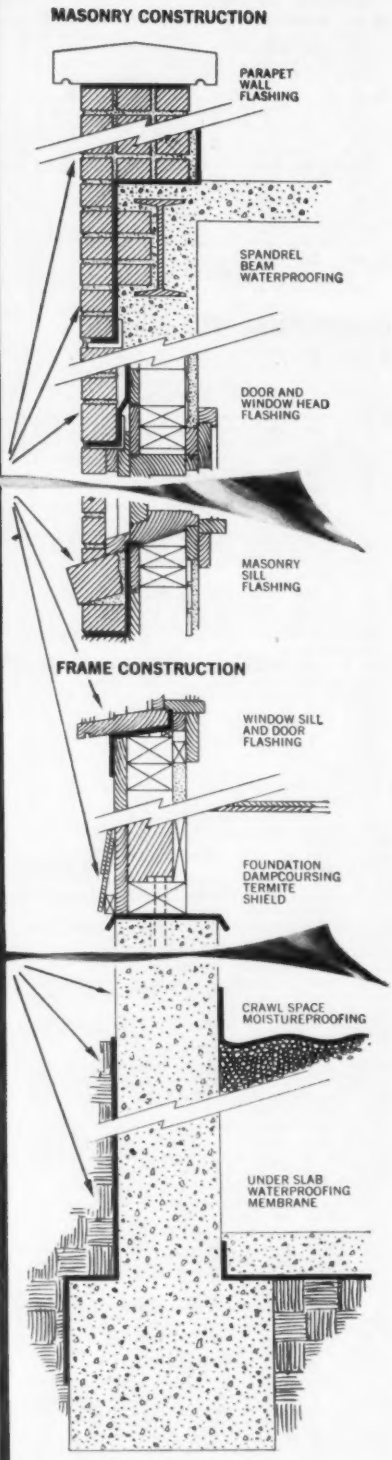

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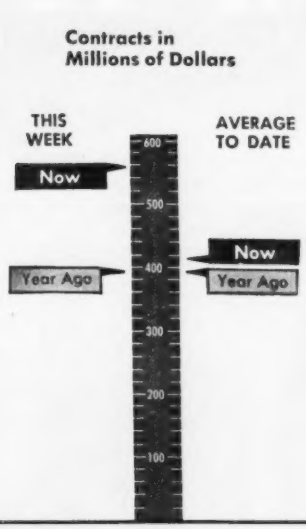
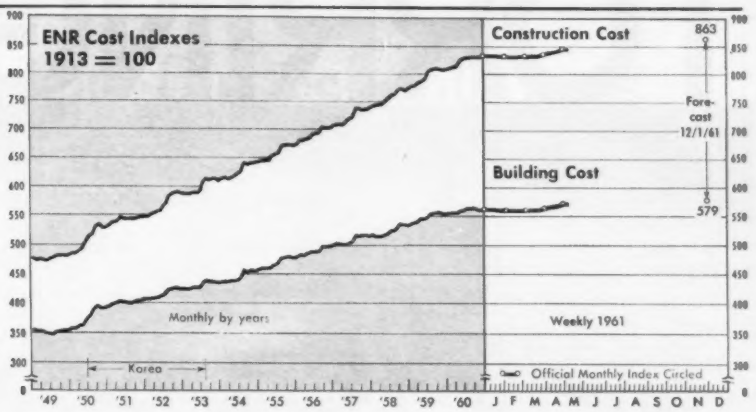
Construction Scoreboard

This Week . . .




ENR Cost Indexes 1913 = 100
Construction Cost
863
Fore-cast 12/1/61
Building Cost
579
Monthly by years
Weekly 1961
Korea
Official Monthly Index Circled
'49 '50 '51 '52 '53 '54 '55 '56 '57 '58 '59 '60
J F M A M J J A S O N D

ENR INDEXES (1913=100), 20-cities' average	Week of May 4 1961	% Change from Apr. 1961	% Change from May 1960
Construction cost	848.60	+1.2	+3.3
Building Cost	569.49	+0.6	+2.1

To convert above indexes to 1926 = 100: Divide Construction Cost by 2.080; Building Cost by 1.850.
1949 = 100: Divide Construction Cost by 4.770; Building Cost by 3.518.

AMOUNT OF CONTRACTS LET

Contracts Awarded In 50 States By Type	This Week millions	Cum. 19 wks 1961	Chge '60-'61 %
All Heavy Construction	$559.7	$7,727.6	+ 2
By Ownership			
PRIVATE	340.7	3,877.9	− 5
PUBLIC	219.0	3,849.7	+ 9
State & Municipal	173.1	2,963.6	+10
Federal	45.9	886.1	+ 5
By Type of Work			
PUBLIC			
Waterworks	3.8	140.4	−16
Sewerage	20.4	262.7	+35
Bridges*	8.9	213.7	−37
Highways	86.0	1,331.0	+24
Earthwork, Dams & Waterways	18.5	302.8	+17
Buildings:			
Excl. Housing	43.4	892.6	+ 9
Housing	10.5	264.9	+46
Unclassified	27.5	441.7	−10
PRIVATE			
Buildings:			
Mass Housing	125.4	1,683.6	−17
Commercial	69.4	851.6	+13
Industrial	132.4	1,174.0	+27
Unclassified	13.5	168.6	−54

*Includes Private bridges

NOTE Minimum size projects included are: Waterworks and waterways, $53,000; other public works, $88,000; industrial buildings, $110,000; other buildings, $400,000.

NEW CONSTRUCTION CAPITAL

	Week of May 4 millions	Cum. 18 wks 1961	Chge '60-'61 %
Corporate Securities	$193.5	$1,051.2	+ 5
State and Municipal:			
All Except Housing	107.7	2,153.6	−10
Housing	2.5	28.6	+110
Federal Loans	5.4	74.8	+23
Federal Aid	0	0	−100
Total Nonfederal	$309.1	$3,308.3	−46
Federal Appropriations:			
Projects in U. S.	0	1.0	−81
Outside U. S.	0	0	−100
Total New Capital	$309.1	$3,309.3	−47

Latest Month . . .

CONTRACTS AWARDED

	1961 Apr. (millions)	1961 4-Mos. (millions)	Percent Change from 1960 Apr.	Percent Change from 1960 4-Mos.
Total U. S. (ENR reported)	$1,817	$6,749	− 9	+ 1
Private	848	3,363	−26	− 7
Public	969	3,386	+13	+11
State and Municipal	776	2,599	+11	+11
Federal	193	787	+22	+10
ENR Volume Index, 1913=100	598	535	−14	−0.4
NEW CONSTRUCTION CAPITAL				
Total U. S.	828	3,000	−0.2	− 7
State and Municipal Bond Sales	365	2,072	−28	− 6
Corporate Security Sales	442	858	+16	− 9
Federal Loans, Aid (nonfederal work)	20	69	−49	−20
Federal Appropriations, (federal work)	1	1	−69	−69

* Includes funds for outside U. S.

MATERIALS SHIPMENTS

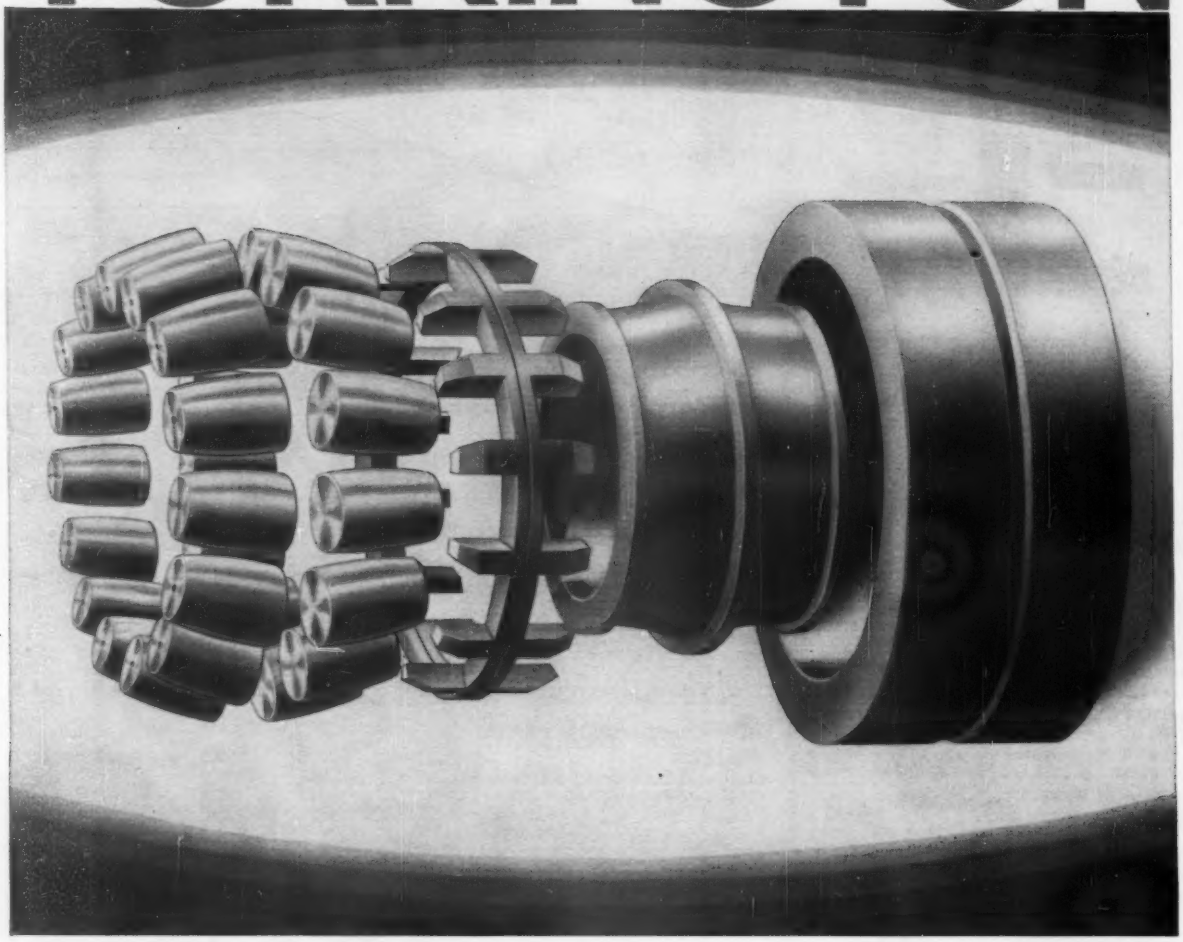
	Mar. Feb. (M) (F)	1961 Cum. (No. of Mos.)	Percent Change from Year Ago Mo.	Percent Change from Year Ago Cum.
Portland Cement, Bur Mines, thous bbls	21,884(M)	50,410(3)	+24	+12
Concrete Paving Awards, PCA, thous sq yd	7,762(M)	23,743(3)	− 1	+12
Fabricated Structural Steel, thous tons	292(M)	814(3)	− 6	−0.4
Bookings, AISC, thous tons	296(M)	860(3)	−23	−10
Reinforcing Bars, Net, AISI, thous tons	n.a.(M)	n.a.(3)	....	....
Lumber, NLMA, mil fbm	n.a.(M)	n.a.(3)	....	....
Orders, mil fbm	n.a.(M)	n.a.(3)	....	....
Production, mil fbm	n.a.(M)	n.a.(3)	....	....
Clay Products, Bureau of Census				
Brick, Unglazed, Common, Face, mil bri	323(F)	664(2)	−13	− 8
Vitrified Clay Sewer Pipe, thous tons	90(F)	205(2)	−15	− 4
Structural Tile, Unglazed, thous tons	27(F)	59(2)	−19	−12
Asphalt Products, Bureau of Census				
Asphalt Roofing, thous sales sqs	1,665p(F)	3,664(2)	−50	−38
Asphalt Siding, thous sales sqs	35p(F)	80(2)	−44	−31
Aluminum, Wrought, Net, Bur Census				
Sheet and Plate (non-heat treatable), mil lbs	87p(F)	182(2)	−14	− 8
Wire and Cable, mil lbs	24p(F)	48(2)	+ 1	+ 3
Extruded Shapes (soft alloys), mil lbs	58p(F)	118(2)	−12	−10

EMPLOYMENT AND FAILURES

Contract Const Employment, BLS, thous	n.a.(M)	n.a.(3)**	....	....
Contractor Failures, Dun & Bradstreet				
Number	266(M)	747(3)	+10	+19
Liabilities, thous	$20,283(M)	$46,457(3)	+ 4	+10

** Average per month
p preliminary figures
n.a. not yet available

TORRINGTON



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New and Old Ideas Cut School Costs

One city goes back to multi-story buildings; another turns to prefabs. Both claim they're saving money.

With the help of a competitive building market and advanced design techniques, two communities count savings of $674,000 on their school construction projects. A third anticipates savings by constructing multi-story school buildings, a type of design it abandoned some years ago in favor of sprawling, one-story buildings.

Des Moines' School Board has saved $500,000 on its 16-building program, which started in 1959. And Elmira, N. Y., figures its total savings on one school building at $174,360.

Des Moines received the good news when it opened bids for its sixteenth building, for which $1.3 million had been allotted. The bid was $137,000 under the estimated cost, which rang up the $500,000 savings on a program expected to cost $8.9 million. Two of the 16 projects over-ran the budgets; the others came in below estimates.

These savings will be turned back to contractors in a sense because the Education Board decided to build an addition to an existing school at an estimated cost of $200,000. This outlay had not been budgeted because of the burden of the over-all construction program.

Credit for the savings goes to architects and contractors, according to Arthur Templeton, assistant to the superintendent of schools and director of buildings and grounds department. "Costs were cut by simplifying design, eliminating waste floor space, lowering ceilings when possible, eliminating high or gabled roofs, using pre-fabricated building units, and using repetitive design wherever possible," he says.

In Elmira, a 1,600-student school containing 55 classrooms gets under way at a cost of $2.2 million, including site development. Officials say the square foot cost of $14.86 cents compares with a statewide average of $17 to $18 psf. It will be a modular steel type of construction with prefabricated steel panels, a school-construction design developed by U. S. Steel Corp.'s American Bridge Division. The general contractor, Streeter Associates of Elmira, figures construction time at 280 calendar days. Considine and Haskell are the architects.

The Dallas school system is going back to the "old look" in junior and senior high schools. All future schools will be three-story buildings, reversing the trend to long, sprawling designs.

Reasons for the change, according to school superintendent W. T. White: Three-story construction will make heat distribution easier, save on construction costs, decrease the time needed by students to move from class to class, and provide more playground space around the buildings.

Dallas has several long, low school buildings. "We have found," says Mr. White, "that it takes the children from eight to ten minutes to go from one end to the other, which adds up to about one hour travel time per day. Since new schools must be even larger, the added travel time could be a handicap to school operation."

March Equipment Orders Up 2%

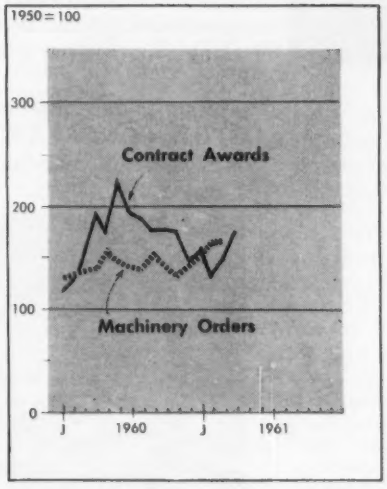
New orders for construction equipment edged higher in March, according to the McGraw-Hill Economics Department index. The index is based on reports to McGraw-Hill by cooperating manufacturers.

The index moved up 2% from February to 167. This is 19% above the March 1960 value and was the third highest March on record, topped only by 1951 and 1956's peak of 193. The last is the highest for any month in the 11-year history of the index.

The outlook for construction equipment sales improves each month as highway awards trend upward, while a rebound in industrial building takes shape as manufacturers appraise the future with increased optimism.

For the first quarter as a whole, the equipment index average 17% above one year ago. Significantly, February and March orders pulled the trend for machinery orders above that of contractors' new business, which is measured by ENR's Heavy Construction Contract Index. For more than a year the orders index had remained below the contract trend.

In April, the Contract Index climbed



to 177. This, however, is 9% below a year ago, and the third consecutive month to slip below one year ago.

The gap in contracts was primarily due to the big volume of contracts for mass housing, bridges and missile bases awarded in April, 1960. Both the Contract Award Index and the New Orders Index are based on 1950 as 100.

Prudential Job Resumes as Mass. Pike Bonds Try Again

It looks as if the on-again-off-again extension of the Massachusetts Turnpike is on again. A Turnpike Authority spokesman last week said its bonds will be offered again by July 1.

The first attempt to market the issue failed (ENR Apr. 20, p. 93). That failure also cast doubt on the $165-million Prudential Center in Boston, at a standstill since last fall. Now that too may start soon.

Prudential Insurance Co. last week told the Boston Redevelopment Authority it is ready to renew construction at the site, but on a reduced scale. It would cut the size of the project about 36% by postponing any work on the six 25-story apartment buildings planned for one end of the tract. But work would resume on a 52-story office building, a hotel and a bank building. This would shave the estimated cost from its original $165 million to about $100 million.

Prudential officials doubt a quick decision on a highway into Boston. Since Prudential cannot afford a long delay on its project, it has decided to build to a plan that will not be affected by failure to build the road.

NEW

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Adjustable Amplitude
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Adjustable Length
Adjustable Crown

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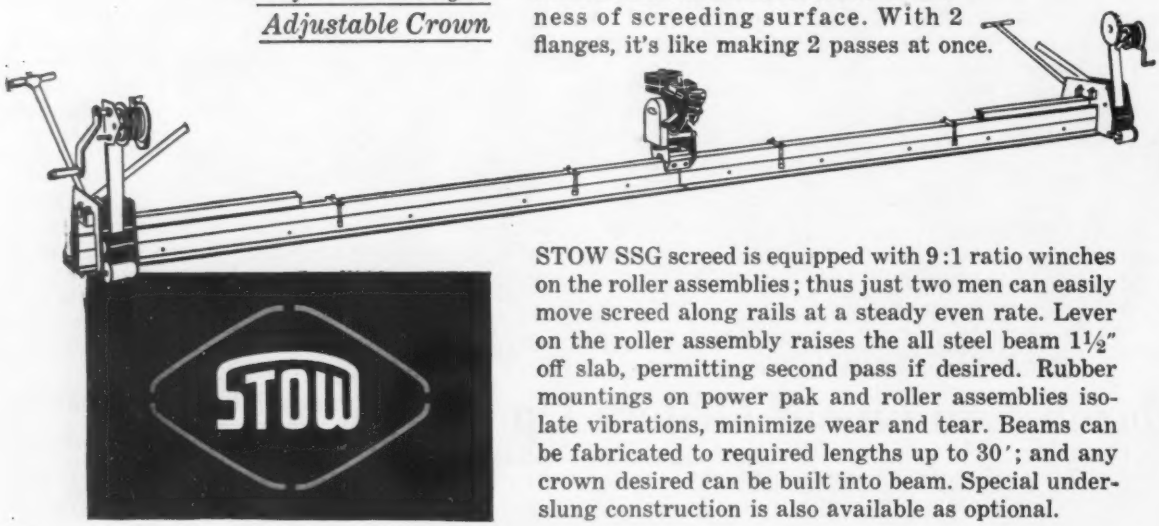
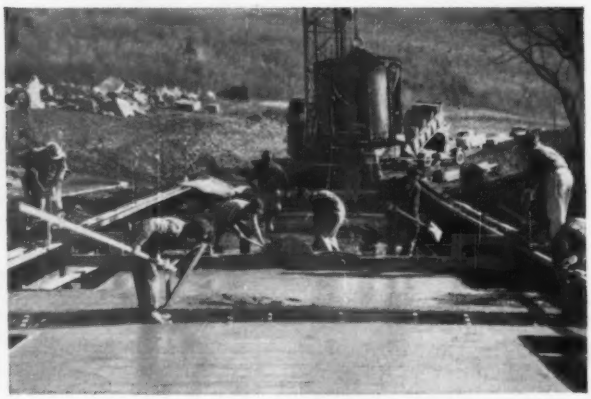


STOW SSG screed is equipped with 9:1 ratio winches on the roller assemblies; thus just two men can easily move screed along rails at a steady even rate. Lever on the roller assembly raises the all steel beam 1½" off slab, permitting second pass if desired. Rubber mountings on power pak and roller assemblies isolate vibrations, minimize wear and tear. Beams can be fabricated to required lengths up to 30'; and any crown desired can be built into beam. Special underslung construction is also available as optional.

For up-to-date information on the complete line of STOW CONCRETE CONSTRUCTION EQUIPMENT—call your STOW distributor or write for Catalog 610.



Model SASG (shown at right on bridge deck) is available in lengths from 20 to 50 feet. Similar to Model SSG, it is equipped with two power paks and has an adjustable center hinge assembly for a crown of up to 3". Special underslung construction available also.

STOW MANUFACTURING CO. DEPT. B-10 19 SHEAR ST., BINGHAMTON, NEW YORK

UAW Denounces Construction Industry

- **Auto workers accuse contractors and building trades of pirating their jobs.**
- **They will seek restrictions on contracting out when they bargain with auto firms this summer.**

Walter Reuther's United Auto Workers Union has served notice that it will take a swing at the building trades unions, contractors and the Construction Industry Joint Conference when it opens collective bargaining negotiations with the big automobile manufacturers this summer.

Winding up a three-day convention in Detroit last week on bargaining objectives for this year, 2,400 union delegates confidently handed Mr. Reuther broad power to bargain for a non-specific controversial and far-reaching list of demands.

Angered by the construction industry's promotion of construction by contract, the delegates said:

"There has been under way for some months a concerted and systematic campaign by certain unions, acting in collusion with management, whose purpose it is to pirate legitimate manufacturing, maintenance, transportation and other work from UAW members.

"This campaign has been waged by offering lower wage rates to prospective employers, since no fringe benefits—long enjoyed by UAW members—need be paid under their labor contracts."

"At the same time," the UAW continued, "these unions establish picket lines falsely alleging jurisdiction over work that is not theirs by tradition or charter."

The skilled trades conference of the UAW charged in a resolution that "a management-conceived pamphlet, circulated throughout the length and breadth of our country and entitled 'Maintaining Production for America,' by the Construction Industry Joint Conference, and other material of this nature, is in reality a practice of raiding and stealing jobs which constitutes a serious threat to our skilled trades workers . . ."

The delegates urged the UAW's Executive Board to notify all bargaining committees, both local and national, that "where this problem of outside contracting exists, contract clauses shall be negotiated prohibiting such action by the company unless by mutual agreement with the UAW."

The CIJC pamphlet was issued nearly two years ago (ENR Oct. 29, 1959, p. 92) and has been a sore point with the industrial unions ever since. Members of the construction industry have meanwhile gone ahead with a standard maintenance agreement program. Last month, the National Labor Relations Board pointed out to the industrial unions the value of the kind of restrictive clause the UAW seeks when, in the absence of such a clause, it approved the negotiation of a maintenance contract by Fibreboard Paper Products Corp. with Fluor Maintenance, Inc. without first bargaining or consulting with the industrial union at Fibreboard (ENR Apr. 13, p. 188).

Against this background, last week's charge by the UAW is merely another chapter in the mounting conflict between the AFL-CIO's craft and industrial unions. That conflict has just torpedoed the building trades' efforts to get congressional approval of the situs picketing bill and is deepening the rift between Mr. Reuther and AFL-CIO President George Meany (ENR May 4, p. 76).

Bargaining negotiations between the UAW and the auto makers are scheduled to begin July 1. Contracts expire with the "Big Three"—Ford, General Motors and Chrysler—on August 31.

The program adopted by the UAW promises to throw onto the bargaining table some of the most fundamental issues ever raised in negotiations. One of the big questions to which many of the demands relate is this: Why should hourly wage earners not have the same income and job security that management and other salaried workers enjoy?

The list of proposals the UAW will offer include:

- A flexible workweek with no loss in take-home pay. When unemployment rises, the workweek would drop. If they work less than 40 hours, workers would be paid for a full week from a national fund into which employers would contribute 1% of their payrolls.
- The payment of salaries to production workers, who are now paid hourly wages.
- Higher supplemental unemployment benefits and more liberal pension benefits, including provision for earlier vesting of pension rights.
- An automation fund that would pay the expense of relocation and retraining of workers displaced by automation.
- Adjustment upwards of the annual improvement factor clauses to compensate workers for increased productivity resulting from technological advancement.

Mr. Reuther called the plan the "boldest and most comprehensive collective bargaining program ever adopted." He hopes the breadth of the program will prevent the union from being squeezed into narrow bargaining.

Emil Mazey, the union's secretary treasurer, reported that the UAW strike fund will stand at more than $40 million by the end of August.

Building Tradesmen Push Average Wage to $3.72

The average hourly wage scale of union building trades workers rose to $3.72 during the first quarter of this year, according to the U.S. Labor Department's Bureau of Labor Statistics. The gain during the quarter was 0.3%, slightly greater than the one for the same quarter last year.

This means that the level of union wages is now 15.2 cents—or 4.3%—higher than it was a year ago, the bureau said. By trades, the increases in average hourly scales over the twelve-month period have ranged from 10.5 cents for plasterers to 18.7 cents for electrical workers.

In its quarterly survey of rate changes for seven major building trades in 100 cities, the bureau found that rates for carpenters advanced in 18 cities during the first quarter, while wage changes for other trades occurred in nine to 16 cities. Increases for individual trades ranged from four to 30 cents an hour and the majority were for 10, 12.5 and 15 cents.

The bureau said the April 3, 1961 average hourly scale of $3.72 was 80% above the average for the three years 1947-49.

The seven trades covered in the survey, and their April 3 average wage scales, were: bricklayers, $4.23; carpenters, $3.83; electrical workers, $4.09; painters, $3.60; plasterers, $4.10; plumbers, $4.05; and building laborers, $2.84.

Who's Covered by the New Wage Bill?

In construction, not many now. But what Congress meant is not yet clear, so even the experts are cautious.

The new federal minimum wage law goes into effect on September 5 but its precise impact on the construction industry is an unknown quantity.

Government officials have just begun to explore the ramifications of the law's new coverage test and how it fits into existing rules developed under present law.

Meanwhile, we are told that the new law extends its coverage of workers in the construction industry to include an estimated one million construction employees—mostly those on major home, hospital and other building projects. Construction workers on interstate projects such as roads, bridges, factories and the like have been covered under the old rules.

The new law, passed and signed last week, boosts the minimum wage of 24 million workers already covered to $1.15 immediately, and to $1.25 after two years. The provision for overtime at time-and-one-half for these employees remains the same.

Some 3.6 million newly covered workers come under different wage and overtime provisions of the new law. Their wage minimum will be the current $1 an hour for three years, $1.15 the fourth year going to the $1.25 wage in the fifth year. Overtime provisions are also stretched out: no overtime for the first two years, after 44 hours the third year, and 42 hours the fourth year. In the fifth year, overtime pay will be required at time-and-one-half after 40 hours.

Actually, as far as construction workers are concerned, the first effects of the law are expected to be negligible. Most construction workers are paid higher than the current minimum. The overtime provisions through which most of the workers will benefit do not begin to apply until 1963.

The extended coverage in construction is applied to enterprises doing at least $350,000 in annual business. Labor Department minimum wage experts, now working to assess the effects of the new law, interpret construction coverage this way:

- The immediate effect will be a wage boost to $1 an hour for an estimated 50,000 common laborers, mostly in the South, who now receive less than the $1 an hour minimum.
- The term "enterprise" means that all construction units of a construction firm will be covered if their total business operations reach the $350,000 figure. This does not apply to other activities of a contractor not related to construction, but it does include supply plants or other similar activities tied to construction.
- Engineering consulting firms do not come under the $350,000 rule, but their employees are covered if their business grosses at least $1 million—the figure that applies to retail and service firms brought under the new law.
- The dollar volume tests apply only where an enterprise has at least one employee who is handling interstate business. If an employer meets the test, then all of his employees are covered.
- By the same token, all employees will be covered in those firms that have had some employees covered in the past, if the firms now meet the new dollar volume tests.

These are preliminary interpretations of the new law. Labor Department analysts emphasize that they do not know the full effect of the new minimum wage provisions in construction. Nor do they yet have a breakdown on the newly covered one million construction employees, either where they are located geographically or by trade.

However, they say the new $350,000 test will bring major contractors doing homebuilding, apartment and school construction work and the like under the law.

Wage Gains Continue Strong

New agreements generally follow long-term pattern, granting annual wage increases of 5 to 25 cents

Carpenters in Los Angeles and Philadelphia have lost their bids for shorter workweeks.

The Los Angeles carpenters have accepted a new agreement that gives them a 17½-cent wage increase on June 15, plus a new 10-cent vacation plan effective next March 1.

The Philadelphia carpenters settled for a two-year contract that adds 21½ cents more to wages and 13 cents more to fringe benefits.

Elsewhere, collective bargaining in the construction industry has produced a number of strikes and an assortment of new contracts with wage increases ranging from zero to 25 cents an hour this year. Most of the contracts are for two- or three-year terms, although those in Des Moines, Iowa, are following a one-year, 15-cent pattern.

The Los Angeles carpenters agreement runs to next May 1 and affects 55,000 workers in 11 southern California counties. New scale will be $4.00 an hour effective June 15.

The Philadelphia agreement covers 7,000 carpenters in institutional, commercial and industrial construction in a five-county area. It carries an 11½-cent wage increase for this year and another 10-cent boost next year. Health and welfare benefits will go up five cents immediately, making a total of 15 cents; a new pension plan, to which employers will contribute eight cents an hour, will become effective next year.

The new contract averted a threatened strike, although it has not yet been ratified. The journeyman scale will be $4.10 after the second year increase becomes effective.

In Grand Rapids, bricklayers have signed a new contract with no changes from the old one. The absence of new demands "was in the interest of stimulating building and business in the area," a union spokesman said. Bricklayers in three Ohio counties (Clark, Champaign and Logan) have also agreed to forego a wage increase for the next 12 months.

Carpenters in Grand Rapids, however, have settled for a package increase of 22½ cents—10 cents now in wages (making the new scale $3.60), 2½ cents more for the vacation fund (bringing this to 10 cents an hour) and a new, 10-cent pension fund that becomes effective next May.

Larger increases appear to be the order of the day in a series of new contracts negotiated in several Iowa cities. Most of the agreements are for two years, but there is a wide variation in the size of wage increases.

For example, bricklayers in Ames get 50 cents in three installments (25, 10, 15); cement finishers in Ottuma win 35 cents in two steps (20, 15); sheet metal workers in Sioux City accept 30 cents in two installments (15, 15); and laborers in Clinton sign for 25 cents in two steps (15, 10). A few

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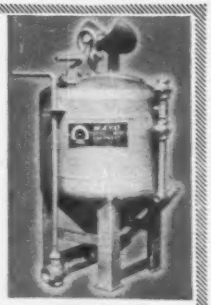

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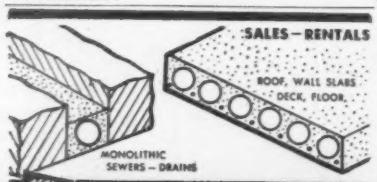

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trades settled for one-year contracts—among them, bricklayers in Marshalltown for 25 cents, plasterers in Waterloo for five cents, laborers in Sioux City for eight cents.

The trend toward long-term contracts was also reversed in Des Moines, where contractors said economic conditions are too uncertain to bargain into the future.

Settlements to date are following a one-year, 15-cent pattern, although painters won 17 cents. Unions have the option in some cases of diverting a portion of their increase to fringe benefits.

In Columbus, Ohio, several trades have settled for long-term contracts: Bricklayers for 28 cents in wages and fringe benefits in five installments over three years; iron workers for a 30-cent wage increase (10, 5, 15) in a two-year contract; painters for 12½ cents more in fringes now, plus two subsequent 10-cent annual pay raises, in a three-year contract; and terrazo workers for a two-year, 20-cent (10, 5, 5) contract.

Among the collective bargaining strikes reported last week were one by plumbers in Fort Dodge, Iowa, one by laborers in the Beaumont-Port Arthur area of Texas, one by operating engineers and plumbers in the Albany-Troy, N. Y., area, and one by roofers in Columbus. Teamsters struck six mason supply firms in Rochester, N. Y.—the first time in 14 years.

An operating engineers strike over travel pay at the Chesapeake Bay bridge-tunnel project is still on, although the union settled with eastern Virginia contractors on the basis of a two-year pact that grants wage increases of five to 12½ cents this year and 10 cents next year.

Union Sued for Damages In Hiring Hall Dispute

The general contractor for General Electric's $30-million space laboratory at King of Prussia, Pa., has sued Local 542 of the operating engineers union for $150,000 in damages.

The local began picketing the project April 19 after the contractor reportedly refused to put in writing a purported agreement to hire through the union hiring hall. The contractor claimed the picketing cost him $15,000 a day.

The picketing was formally disapproved by the AFL-CIO Building and Construction Trades Council of Philadelphia and Vicinity. Members of other trades refused to honor the picket line after that action.

The operating engineers local, which represents 5,200 workers on heavy equipment in eastern Pennsylvania and Delaware, has since withdrawn from the council.

OFFICIAL PROPOSALS

Bids: May 19, 1961

West Virginia Turnpike Commission

ADVERTISEMENT FOR PROPOSALS

Sealed proposals will be received by the West Virginia Turnpike Commission for:

CONTRACT NO. M-14

The work to be done under Contract No. M-14 consists of furnishing all labor, materials and equipment for cleaning and repainting all exposed surfaces of steelwork on the Yeager Bridge over the Kanawha River near Mile 86 in Kanawha County, West Virginia, which bridge forms a part of the West Virginia Turnpike.

The approximate tonnage of steelwork to be repainted is 3,360 tons.

Proposals will be received at the office of the West Virginia Turnpike Commission, Administration Building, Port Amherst, West Virginia, until 2:00 P.M., Eastern Standard Time, on May 19, 1961, at which time and place said proposals will be publicly opened and read.

Contract documents may be inspected by prospective bidders during office hours at the office of the Commission, and will be furnished for Five Dollars ($5.00) per set, not refundable, upon application to the Commission at the above address. Checks shall be made payable to the West Virginia Turnpike Commission.

Inspection of the steelwork on and above the surface of the bridge roadway will be permitted only on May 11 and 12, 1961, and then only after prior arrangements have been made with the General Manager of the Turnpike.

Proposals must be made upon the proposal forms furnished by the Commission in the manner designated in the specifications, and must be enclosed in sealed special address envelopes bearing the name and address of the bidder and the number of the contract on the outside, and must be accompanied by a CASHIER'S or CERTIFIED CHECK or PROPOSAL BOND in favor of the West Virginia Turnpike Commission FOR AN AMOUNT EQUAL TO FIVE (5) PER CENT OF THE AMOUNT OF THE PROPOSAL, but not less than $500.00 nor more than $200,000.00 and must be delivered at the place designated above on or before the day and hour named. Copies of the proposal form and proposal bond form to be used for submitting proposals, and of the special addressed envelope are furnished in detached form with the contract documents.

The Contract will be awarded or proposals rejected within thirty (30) days from the date of opening proposals. The right is reserved to reject any or all proposals, and to waive any or all formalities.

WEST VIRGINIA
TURNPIKE COMMISSION
W. C. Stathers
Chairman

Bids: June 5, 1961

The Easton Utilities Commission

ADVERTISEMENT FOR BIDS

Sealed Proposals will be received by The Easton Utilities Commission of Easton at their Office in Easton, Maryland until 8:00 P. M., E.D.S.T. Monday, June 5, 1961 for construction and installation of a fifty (50) acre Primary and a thirteen (13) acre Secondary Waste Stabilization Lagoon, together with all necessary appurtenances, fixtures, and fittings for completing improvements to The Municipal Sewerage System in the Town of Easton, Maryland.

Form of Contract, Specifications and Plans, and Blank Proposals may be obtained from the Secretary-Treasurer of The Easton Utilities Commission upon Deposit of fifty dollars ($50.00).

A certified check, cash or a Bid Bond in an amount of not less than five percentum (5%) of the amount of the base bid must accompany each bid.

The Easton Utilities Commission of Easton, Maryland reserves the right to reject any or all bids or sections of bids as deemed to the best interest of the Town of Easton, Maryland.

Sheldon E. Dietert
Secretary-Treasurer

William H. Corkran, Jr.,
Town Engineer.

OFFICIAL PROPOSALS

Bids: May 25, 1961

New York State Road Work

NOTICE TO CONTRACTORS: STATE DEPARTMENT OF PUBLIC WORKS, ALBANY, N. Y., Pursuant to the provisions of the Highway Law, and special provisions for projects financed with Federal Aid Funds, sealed proposals will be received until ten-thirty o'clock A.M., advanced standard time, which is nine-thirty o'clock A.M., eastern standard time, on the 25th day of May 1961, by Henry A. Cohen, Director, Bureau of Contracts, 12th Floor, The Governor Alfred E. Smith State Office Building, Albany, N. Y., for the following projects:

County	Contract No.	Name	Miles	Type	Deposit	Estimated Cost of Work
DISTRICT No. 1, F. J. Fuller, District Engineer, 353 Broadway, Albany 1, New York						
Essex Rtes. 22 & 73	FARC 61-57	Ticonderoga-Montcalm Landing, S.H. 8073; Ticonderoga Vill. Pt. 2, FASH 50-7; Ticonderoga-Crown Point Pt. 1, S.H. 891 Schroon Lake-Ticonderoga, Pt. 2, S.H. 8230 Proj. F-371(5)	3.44	Asphalt Concrete 2 Span Comp. Plate Girder Bridge 214.3' Tot.	$80,000 Plans $5	$1,430,000
Essex Rtes. 9 & 22	DA 61-2	Defense Access Improvements on Rte. 9, S.H. 8314, 8238, 232, 859; Rte. 22, S.H. 8128, 1641, 1687, 8238 Proj. RAD 13(5)	25.5	Tree Trimming	$1,000 Plans $5	19,000
Greene Rte. 23	R.C. 61-74	Ashland-Windham, S.H. 8051	4.15	Asphalt Concrete	$8,000 Plans $5	148,000
Essex	DA 61-4	Reber Road—Defense Access Proj. RAD 13(3)	0.46	Asphalt Concrete=0.44 Mi. Misc. Work=0.02 Mi.	$3,500 Plans $5	63,000
DISTRICT No. 2, L. Ketchum, District Engineer, 109 No. Genesee Street, Utica 1, New York						
Oneida Rte 13, 49 & 69	FARC 61-36	Cleveland-Vienna, Pt. 4, S.H. 8103; South Bay-Vienna, Pt. 1 & 2, S.H. 8219; Vienna-Camden, Pt. 1 & 2, S.H. 8186; Camden-Taberg, Pt. 1, S.H. 5461 Proj. F-384(6); F-635(7)	9.32	Asphalt Concrete, Type 2A	$87,000 Plans $5	1,580,000
DISTRICT No. 3, E. E. Towlson, District Engineer, 333 E. Washington Street, Syracuse, New York						
Oswego	M.A. 61-1	Maintenance Area for Interstate Route (505) at Maple View	....	Grading, Drainage & Paving	$9,000 Plans $5	155,000
Seneca Rte. 96A	FARC 61-54	Reservation Rd.-Ovid, Sh 323 Ovid-Romulus, S.H. 5282 Proj. F-626(6)	4.59	Asphalt Concrete Type 1A	$50,000 Plans $5	912,000
DISTRICT No. 4, B. F. Perry, District Engineer, Barge Canal Terminal, Rochester 1, New York						
Monroe (Rte. 47 & Int. Tr. Rte. 490)	FITS 61-12 FATS 61-13	Interstate Rte. Conn. 580 (Fish 56-9 & FISH 58-16) Rochester-Bushnell Basin, Pts. 2 & 3;Rochester Outer Loop (FASH 58-17, FAC 59-8, FASH 59-14 East Ave. to Winton Road) Winton Road-Sea Breeze Pt. 2, (FASH 56-7). Proj. I-490-2(24); U-1097(7)	4.75	Traffic Signs and Delineators	$6,000 Plans $5	109,000
Monroe	FATC 61-2	Rochester City: Inner Loop (FAC 60-7) (Front Street to North Street) Proj. U-1089(14)	0.28	Traffic Signals	$2,800 Plans $5	50,000
Monroe	LOSPTS 61-2 FATS 61-15	Lake Ontario State Parkway (Dewey Ave.-Rochester City Line);Rochester City: Lake Ontario State Parkway Art. Hwy. (Rochester City Line-Lake Ave.) Proj. U-1141(4)	1.68 (0.93 Acc.)	Traffic Signs & Delineators	$2,100 Plans $5	39,000
Monroe Rte. 104	FARC 61-79	Rochester-Webster, Pt. 1, S.H. 98 Rochester-Webster, Pt. 2, S.H. 99 Proj. U-362(12)	1.15	Asphalt Conc=1.04 Mi.; Misc. Work=0.11 Mi. Incl. Bridge Comp. WF Beam 1 Span—74.5' Total	$35,000 Plans $5	633,000
Monroe (Int. Trg. Rte. 490) MDC	FISH 61-14	Interstate Rte. Conn. 580 Rochester Western Expressway (Union St. to West Side Drive) Proj. I-IG 490-2(23)	3.70 (1.26 Acc.)	9" Cem. Conc. Pavt., 2 @ 24' Var.=3.61 Mi., Access=0.76 Mi. Cem. Conc. Pavt. & 0.50 Mi. Asph. Conc. Type 1A. Misc. Work=0.09 Mi.; 2 RRGS Comp. I-Beam, Ea. 3 Sp., 192' Tot. 4 H.C.S. Comp. I-Beam 2-Ea. 3 Sp., 188' Tot.; 2-Ea. 3 Sp., 128' Tot.	$185,000 Plans $5	3,388,000
DISTRICT No. 5, E. G. H. Youngmann, District Engineer, State Office Bldg., 65 Court Street, Buffalo 2, New York						
Chautauqua (Rte. 39)	R.C. 61-75	Sheridan-Forestville, Pt. 1, S.H. 8358	4.84	Asphalt Concrete	$20,000 Plans $5	365,000
Erie Niagara (Rte. 78)	FARC 61-64	Transit, Pt. 2, S.H. 89; Transit Rd. Pt. 3, S.H. 507; Transit Pt. 3, S.H. 507 Proj. F-651(10)	0.65 (0.16 Acc.)	Asph. Conc.=0.50 Mi.; Misc. Work=0.31 Mi. Comp. I-Beam Br. 2 Sps., 157' Tot.	$36,000 Plans $5	663,000
DISTRICT No. 6, Wm. J. Dennis, District Engineer, State Office Bldg., 30 West Main Street, Hornell, New York						
Chemung (Rte. 427)	FARC 61-70	Penn State Line-Wellsburg, S.H. 1710; Wellsburg-Waverly, Pt. 1, S.H. 1764 Proj. S-697(4)	1.31	Asphalt Concrete	$50,000 Plans $5	884,000
Steuben (Rte. 17)	FARC 61-80	Jasper-Addison, S.H. 5253 Proj. F-442(8)	3.97	Asphalt Concrete	$17,000 Plans $5	300,000
DISTRICT No. 7, R. W. Sweet, District Engineer, 444 Van Duzee Street, Watertown, New York						
Clinton (Rte. 22B)	FARC 61-71	Plattsburg-Cadyville, Pt. 1, S.H. 777; Morrisonville-Schuyler Falls, S.H. 1567; Peru-Schuyler Falls, S.H. 1705. Proj. S-548(2)	6.30	Asphalt Conc. Type 1A=6.26 Mi., Misc. Work=0.04 Mi., Comp. I-Beam Br., 3 Sps. 199.38' Tot.	$62,000 Plans $5	1,132,000
Clinton (Rte. 22)	R.C. 61-78	Mooers-Hemmingford, S.H. 8174	3.42	Asphalt Conc. Type 1A	$12,000 Plans $5	206,000
Franklin (Rte. 3)	R.C. 61-77	Piercefield-Tupper Lake, Pt. 2, S.H. 8109	2.13	Asphalt Conc. Type 1A	$5,500 Plans $5	98,000
St. Lawrence, Franklin (Rte. 37) MDC	T.S. 61-14	Massena-Helena, Pt. 1, S.H. 1261; Raquette River-Hogansburg, Pt. 1, S.H. 1861; Raquette River-Hogansburg Pt. 2; St. Regis Indian Reservation-Fort Covington, Pt. 1, S.H. 8396	5.40	Traffic Signs and Delineators	$2,500 Plans $5	47,000
DISTRICT No. 9, J. C. Frederick, District Engineer, 71 Frederick Street, Binghamton, New York						
Broome (Int Trg. Rte. 81)	FISH 61-11 FIC 61-9	Interstate Rte. 505 Five Mile Point to Broad Ave. (Five Mile Point-Binghamton State Hospital) Proj. EI-81-1(12)	3.01 (5.08 Acc.)	9" Cem. Conc. Pavt. 2 @ 24' Var.=2.51 Mi; Asph Conc. Ty. 2A=0.14 Mi.; Misc. Work=0.36 Mi.; Access=3.67 Mi. Cem. Conc. Pavt; 0.05 Mi. Cem. Conc. Pavt with Carb. Black; 1.21 Mi. Asph Conc; 0.15 Mi. Asph. Conc. Type 2A; 7 Hgs Comp. I-Beam, 6 Sps. 310.75' Tot., 4 Sps. 240.2' Tot., 4 Sps. 225.2' Tot., 3 Sps. 158.25' Tot., 3 Sps. 152.5' Tot., 4 Sps. 335' Tot., 4 Sps. 344' Tot.; 1 Br. Comp. I-Beam, 1 Sp @ 42.6'; 2 Hgs Welded Plate Girder; 1 Sp @ 136.4'; 3 Sps 308' Tot.; 5 Brs. Reinf. Conc. Twin Closed Box 41.33' Tot; 41.33' Tot; 41.33' Tot.; 25.5' Tot; 25' Tot.	$400,000 Plans $10	7,414,000

(Continued on page 70)

OFFICIAL PROPOSALS

OFFICIAL PROPOSALS

(Continued from preceding page)

OFFICIAL PROPOSALS

DISTRICT No. 10, A. M. SARR, District Engineer, 325 W. Main Street, Babylon, L. I., New York

Kings (Int. Trg. Rte. 278)	FIGE 61-1	Interstate Rte. Conn. 512 Gowanus Expressway-Cont. 3 (2nd Ave. to 20th St. Incl. Prospect Expressway Interchange) Proj. EI-278-1(60)	0.66 (0.31 Acc.)	Main Line: Reinf. Conc. Slab. Roadway (Struct)= 0.30 Mi. Grade, Drain. & Misc. Work=0.36 Mi., Surf Sts. Grade. Drain. Misc. Work=0.31 Mi. Incl. Elev. Structure & Prospect Exp. Inter.	$375,000 Plans $10	6,819,000
Kings	FAPE 61-2	Prospect Expressway (Fifth Avenue to Greenwood Ave.). Proj. U-1081(5)	1.20	Roadside Development	$6,000 Plans $5	115,000
Kings	FAPETS 61-1	Prospect Expressway: Fort Hamilton Parkway Interchange (Greenwood Ave. to Beverly Rd.-FAPE 59-1) Proj. U-1081(6)	0.54	Traffic Signs	$2,500 Plans $5	42,000
Nassau	FAWOBETS 61-2	Wantagh-Oyster Bay Expressway (Contract 1A) (Old Country Road, C.R. 4 to Jericho Turnpike-Plainview Rd. S.H. 436). Proj. U-1110(4)	3.34	Traffic Signs	$9,000 Plans $5	160,000
Nassau (Rtes. 25, 106, 107)	FATS 61-11	Massapequa-Glen Cove, S.H. 9017; Jericho-Oyster Bay, S.H. 9021; Jericho Turnpike, S.H. 9020; Jericho Turnpike-Plainview Rd. S.H. 436 Proj. US-377(7), US-500(5), U-1000(11)	3.08	Traffic Signs and Delineators	$7,000 Plans $5	130,000
Queens	FAGCP 61-1	Grand Central Parkway: Section 3 (150th St. to 166th Street). Proj. U-629(19)	0.53	Relocation of Utilities (Municipal)	$21,000 Plans $5	398,000
Suffolk	SSP 61-2	Southern State Parkway (New Highway to Captree State Parkway)	6.30	Landscaping	$25,000 Plans $5	452,000

Any projects in this letting that are on the Federal Aid highway systems are subject to the provisions of the "Federal-Aid Highway Act of 1956", being Public Law 627, 84th Congress, approved June 29, 1956, and are also subject to the applicable New York State statutes.

In compliance with the provisions of Section 115 (Prevailing Rate of Wage), Public Law 627, the minimum wages to be paid laborers and mechanics are included in wage schedules that are set out in the bid proposal.

Maps, plans, specifications and proposal forms may be seen and obtained at the office of the State Department of Public Works, Bureau of Contracts, Albany, N. Y., and at the office of the District Engineers noted above, and may also be seen at the office of the State Department of Public Works, 270 Broadway, New York City.

If the deposit is $10.00 or more, full refund for one copy of the plans and specifications will be made to a bidder for the particular project, if such plans and specifications are returned in good condition within 30 days after the award of the contract or after the rejection of the proposal. The successful bidder is not required to return the copy of the plans and specifications in order to be entitled to such refund. If the deposit is $10.00 or more, partial refund will be made for the return of all other copies of plans and specifications in good condition within 30 days after the award of the contract or the rejection of the proposal.

Special attention of bidders is called to "Information for Bidders" in the Public Works Specifications, and to the special provisions applying to projects financed with federal funds. Award of a contract is subject to priorities and allocations under the Defense Production Act of 1950, as amended, and all regulations issued thereunder.

Proposal for each contract must be submitted in a separate sealed envelope with the name and number of the contract plainly endorsed on the outside of the envelope. Each proposal must be accompanied by draft or certified check payable to the order of the "State of New York, Department of Public Works" for the sum as specified in the advertisement and the proposal. The retention and disposal of the bidding check, the execution of the contract and bond shall conform to the provisions of the Highway Laws, as set forth in "Information for Bidders".

The right is reserved to reject any or all bids.

J. BURCH McMORRAN
SUPT. OF PUBLIC WORKS

Bids: May 19, 1961

Delaware Interstate Highway Division

CONTRACT NO. 45
DELAWARE MEMORIAL BRIDGE
ACCESS ROAD TO MEMORIAL PLAZA
NOTICE TO BIDDERS

Sealed proposals for the construction of an access road to the existing memorial plaza just south of the Delaware Memorial Bridge Toll Plaza near Wilmington, Delaware, will be received by the Delaware Interstate Highway Division at the Administration Building, Delaware Memorial Bridge, until 11:00 A.M., Eastern Daylight Saving Time, on May 19, 1961, at which time and place said proposals will be opened and read.

The work to be performed under this Contract includes, but is not necessarily limited to: excavation; embankment construction; pavement, sidewalk, curb and gutter construction; new drainage facilities; topsoiling and seeding; and other incidental work.

Work on this project shall begin within ten (10) days after the execution of the Contract and shall be completed on or before October 20, 1961.

Monthly payments will be made for ninety (90) per cent of the work completed each month.

Bidders must submit proposals upon forms provided by the Division.

Each proposal must be accompanied by an acceptable surety bond, certified check or cash in the amount of at least ten (10) per cent of the total amount of the proposal.

The Contract will be awarded or proposals rejected within thirty (30) days from the date of opening proposals. The right is reserved to reject any or all bids.

One set of the contract documents may be obtained from the Delaware Interstate Highway Division at the Administration Building, Delaware Memorial Bridge near Wilmington, Delaware, after May 8, 1961, upon payment of $10.00. Contract documents need not be returned and the above payment will not be refunded. Checks shall be made payable to Howard, Needles, Tammen & Bergendoff.

Delaware Interstate Highway Division
By: J. H. Tyler McConnell, Director
William J. Miller, Jr., Acting Chief Engineer
Delaware Interstate Highway Division
May 4, 1961

Bids: May 23, 1961

Clearing and Grubbing Cannonsville Reservoir

CONTRACT 479

SEALED BIDS will be received by the Board of Water Supply, at its offices, thirteenth floor, 120 Wall Street, New York City, until 11:00 A.M., Eastern Daylight Saving Time, on Tuesday, May 23, 1961, for Contract 479, for clearing and grubbing the westerly portion of the Cannonsville Reservoir and performing related work, in the Towns of Deposit and Tompkins, Delaware County, New York. The work will comprise the clearing of approximately 1860 acres, the grubbing of about 400 acres, required excavation and removal of excrementitious material, all as set forth in the specifications.

Pamphlets of the contract can be obtained in the Secretary's office, Room 1312, at the above address, upon application in person or by mail, by depositing the sum of $10.00 for each pamphlet. There will be a charge of $1.00 to cover mailing costs for each set of contract pamphlets requested. For further particulars, apply at the office of the Chief Engineer at the above address.

ARTHUR C. FORD, President, EDWARD C. MAGUIRE, HERBERT M. ROSENBERG, Commissioners; Board of Water Supply; BETTY COHEN, Acting Secretary.

District of Columbia—Highway Construction—Dept. of Highways & Traffic, D. C., April 18, 1961. ANACOSTIA FREEWAY PENNSYLVANIA AVENUE INTERCHANGE PAVING, GRADING, DRAINAGE AND STRUCTURES, FEDERAL-AID PROJECT NO. U-45(22), Invitation No. C-6182-H, consisting of approx. 14,000 sq. yds. Reinf. Portland Cement Concrete Pavement 9" depth; 7,303 Tons hot asphaltic concrete base, Class B; 1,984 Cu. Yds. Class BB concrete for footings; 2,882 Cu. Yds. Class BB concrete for walls and piers; and 1,017,800 lbs. structural steel. (Wage rates have been predetermined by Labor Dept.) Bid forms, plans and specifications are now available from Supervisor, Bid & Contract Division, Procurement Office, D. C., Room 404, 499 Pennsylvania Ave., N.W., upon deposit of a certified check for $30.00 per set, payable to D. C. Treasurer (Phone NA 8-6000, Ext. 448). SEALED BIDS to be opened 3:00 PM, EDT, May 23, 1961, in Room 424, 499 Penn. Ave., N.W.

U. S. Government

DEPARTMENT OF THE INTERIOR, Bureau of Reclamation. Sealed bids (Specifications No. DC-5588) will be received at Farmington, New Mexico until 10 a.m., Mountain Standard Time, June 8, 1961, for furnishing labor and materials for Earthwork and Structures, Main Canal, Station 359+55 to Station 1476+60, and Laterals, and Gravity Extension, East Highline and West Highline Laterals, Hammond Project, New Mexico. Location east of Farmington, New Mexico, in San Juan County. Principal items are 964,000 cu. yds. of excavation; 21,520 lin. ft. of furnishing and laying concrete pipe; 1,600 cu. yds. of concrete; and other work. Completion time 400 days. For particulars, address Bureau of Reclamation, P. O. 360, Salt Lake City 10, Utah; P. O. Box 28, Farmington, New Mexico; or Building 53, Denver Federal Center, Denver 25, Colorado. Floyd E. Dominy; Commissioner.

DEPARTMENT OF THE INTERIOR, Bureau of Reclamation. Sealed bids (Specifications No. DC-5590) will be received at Ogden, Utah, until 10 a.m., Mountain Standard Time, June 15, 1961, for furnishing labor and materials for Earthwork and Pipelines, North Davis Laterals, Unit 2B, Davis Aqueduct Lateral System, Weber Basin Project. Location near Ogden, Utah, in Davis County. Principal items are: Excavation 38,300 cu. yds.; Backfill 34,600 cu. yds.; Pipe 54,000 linear feet; and other work. Completion time 475 days. For particulars, address Bureau of Reclamation, P. O. Box 360, Salt Lake City, Utah; P. O. Box 387, Ogden, Utah; or Building 53, Denver Federal Center, Denver 25, Colorado. Floyd E. Dominy, Commissioner.

DEPARTMENT OF THE INTERIOR, Bureau of Reclamation. Sealed bids (Specifications No. DC-5600) will be received at Ogden, Utah, until 10 a.m., Mountain Standard Time, June 13, 1961, for furnishing labor and materials for Earthwork and Structures, Willard Canal, First Stage, Weber Basin Project, Utah. Location near Ogden, Utah, in Box Elder and Weber Counties. Principal items are 353,000 cu. yds. excavation; 5,500 lin. ft. of concrete, corrugated metal and sewer pipe; and other work. Completion time 180 days. For particulars address Bureau of Reclamation, P. O. Box 387, Ogden, Utah; P. O. Box 360, Salt Lake City, Utah, or Building 53, Denver Federal Center, Denver 25, Colorado. Floyd E. Dominy, Commissioner.

OFFICIAL PROPOSALS

Bids: June 7, 1961

Elizabeth River Tunnel Commission Norfolk, Virginia

May 3, 1961

Sealed proposals for CONTRACT NO. 5, Toll Plaza Area and Buildings, of the SECOND ELIZABETH RIVER TUNNEL and APPROACHES, will be received by the Elizabeth River Tunnel Commission at the City Council Chamber, City Hall Building, 235 East Plume Street, Norfolk, Virginia, until 2 P.M. (EST) Wednesday, June 7, 1961, at which time and place the bids will be publicly opened and read aloud.

The work under CONTRACT NO. 5 consists in the construction of the Toll Administration Building the Maintenance Building, the Toll Booths and Canopy and the Toll Plaza pavement in Portsmouth and the Crash Truck Garage and Storm Water Pumping Station in Norfolk; the installation of Toll Collection Equipment; complete Mechanical and Electrical Work for the structures; and miscellaneous work, such as yard paving, curbs, sidewalks, fences, topsoiling, seeding and landscaping.

Plans and Specifications may be viewed at the office of the Commission at the Administration Building, Berkley, Norfolk, Virginia, and may be viewed and purchased at the office of the Engineer, Parsons, Brinckerhoff, Quade & Douglas, 165 Broadway, New York 6, New York, upon payment of $35.00 per set. Additional sets of Plans will cost $25.00; and additional copies of Specifications will cost $10.00. DOCUMENTS ARE NON-RETURNABLE FOR REFUND. The Specifications, consisting of the Standard Specifications (Virginia Department of Highways, Road and Bridge Specifications, April 1, 1958 Edition), and the Special Provisions will include copies of the Proposal form, Proposal Bond form, Contract form, and Contract Bond form. Also furnished in the Contract Document Set will be pertinent sheets from the Road Designs and Standards of the Department of Highways. Any and all other pertinent information may be obtained at the New York office of Parsons, Brinckerhoff, Quade & Douglas.

Bidders are required by law to be registered with the State Registration Board for Contractors in Virginia.

A Proposal Bond, prepared in the form furnished, will be required of the bidder, in the amount of not less than twenty percent (20%) of the aggregate bid for all work performed under CONTRACT NO. 5.

The Elizabeth River Tunnel Commission reserves the right to reject any and all proposals.

Bids: May 31, 1961

Town of New Windsor, Orange County, New York

BIDS ON APPROXIMATELY 85,000 FEET OF WATER MAIN

for the Town of New Windsor, Orange County, New York (Water District 5) located adjacent to City of Newburgh.

Sealed proposals for furnishing and placing of approximately 85,000 feet of asbestos-cement water mains in sizes 4 through 12-inch with hydrants, valves, etc. will be received by the Town of New Windsor until 8:00 P.M., Eastern Daylight Saving Time, May 31, 1961 at the office of the Town Clerk, Mrs. Julia Tuckosh, Town Hall, Union Avenue, New Windsor, New York, (mailing address: M.D. 14, Newburgh, New York), at which time and place all bids received will be publicly opened and read aloud. Contract plans and documents may be examined at the office of the Town Clerk and copies thereof obtained upon payment of $25 for each set (non-bidder refund $10).

5% bid security required. 500 consecutive calendar days completion time. It is expected, but not guaranteed, that contract will be awarded to lowest responsible bidder within 30 days after date of opening.

All requests for plans and specifications must be made to Town Clerk.

Engineers are Morrell Vrooman Engineers of Gloversville, New York.

By Warren Sloan, Sr., Supervisor
TOWN OF NEW WINDSOR

READ THE OFFICIAL
PROPOSAL COLUMN OF
ENGINEERING NEWS-RECORD
THIS WEEK AND EVERY WEEK

OFFICIAL PROPOSALS

OFFICIAL PROPOSALS

AUSTRALIA

SNOWY MOUNTAINS HYDRO-ELECTRIC AUTHORITY

Tenders are invited for Schedule of Rates Contracts for furnishing labour and materials and performing all works for the construction in New South Wales, Australia, of the EUCUMBENE-SNOWY TUNNEL AND APPURTENANT WORKS.

The whole of the works is to be performed under two separate contracts as follows:—

CONTRACT NO. 20,044 — **EUCUMBENE SECTION OF THE EUCUMBENE-SNOWY TUNNEL AND APPURTENANT WORKS**

This section of the tunnel will be a horseshoe shaped tunnel 20'4" high and 20'8" wide and will be about 36,000 feet long. It will be unlined for a large proportion of its length the remainder being concrete lined.

CONTRACT NO. 20,045 — **ISLAND BEND SECTION OF THE EUCUMBENE-SNOWY TUNNEL AND APPURTENANT WORKS.**

This section of the tunnel will be a horseshoe shaped tunnel 20'4" high and 20'8" wide and will be about 36,000 feet long. It will be unlined for a large proportion of its length, the remainder being concrete lined. The contract also includes the construction of three 16 foot diameter shafts at Island Bend, two approximately 400 feet deep and one approximately 300 feet deep and a 6 foot diameter steel lined shaft approximately 400 feet deep part way along the tunnel at Burrungubugge River.

ALTERNATIVE TENDERS

Tenderers are invited to submit tenders for one or both contracts, and may submit an alternative tender conditional on the Authority accepting their tenders for both contracts.

TENDER DOCUMENTS

The Forms of Tender, Conditions of Tendering, General Conditions of Contract, Draft Form of Agreement, Schedules of Rates, Tables of Estimated Quantities and Amounts, Specification and Drawings for both Contracts are combined in a single set of tender documents. Tender documents will be available on May 22, 1961, and may be obtained by prospective tenderers at a cost of $22.50 per set on application to:—

Australian High Commissioner,
Royal Bank Chambers,
100 Spark Street
OTTAWA,
CANADA.

Australian Consulate-General,
International Building,
Rockefeller Center,
636 Fifth Avenue,
NEW YORK,
U.S.A.

Australian Consulate-General,
153 Kearney Street,
SAN FRANCISCO,
U.S.A.

Liaison Officer,
Snowy Mountains Hydro-electric Authority,
c/o United States Bureau of Reclamation,
Federal Center,
DENVER, COLORADO,
U.S.A.

All relevant information may be obtained from the above offices.
Four additional sets of documents for purposes of tendering will be provided free of charge at the time of inspection of the site.

SUBMISSION OF TENDERS

Tenders for the contracts must be submitted in duplicate in accordance with the Conditions of Tendering, enclosed in sealed envelopes appropriately endorsed with the contract numbers and names of the works tendered for, and addressed to:—

The Business Manager,
Snowy Mountains Hydro-electric Authority,
Post Office Box 332,
COOMA NORTH, N.S.W., Australia.

The tenders must be lodged in the Tender Box at Head Office of the Authority at Cooma or be sent by prepaid post in time to be delivered in ordinary course of mail by 12.00 noon on Monday, August 21, 1961.

K. See, Business Manager

Bids: May 29, 1961

County of Monmouth State of New Jersey

INVITATION TO BID

Notice is hereby given that sealed bids will be received by the Board of Chosen Freeholders of the County of Monmouth for reconstruction of the following bridges and approach roads: (a) Phalanx Road and Bridge A-38; (b) Laird Road and Bridge A-42; (c) Muhlenbrink Road and Bridge A-40; and (d) Long Bridge Road, Bridge A-54 and Culvert H-32; and opened and read in public in the Hall of Records, Main Street, Freehold, New Jersey, on Monday, May 29th, 1961 at 2:00 p.m. Eastern Daylight Saving Time.

Plans, specifications and form of bid, contract and bond for the proposed work, prepared by American Water Works Service Company, Inc. and H. Leroy Martin, Monmouth County Engineer, have been filed in the Hall of Records, Main Street, Freehold, New Jersey and may be inspected by prospective bidders during business hours. Bidders will be furnished with a copy of the plans and specifications by the Engineer upon proper notice and payment of a fee of Twenty Five Dollars ($25.00), payable to the Treasurer of the County of Monmouth.

Bids must be made on standard proposal forms in the manner designated therein and required by the Specifications; must be enclosed in sealed envelopes bearing the name and address of the bidder and the name of work on the outside, addressed to the Board of Chosen Freeholders of the County of Monmouth and must be accompanied by a bonding certificate and a certified check, drawn to the order of the Monmouth County Treasurer, for not less than Ten Per Cent (10%) of the amount bid and be delivered at the place and on the hour above named. The standard proposal forms will be furnished upon application to the Monmouth County Engineer.

The right is reserved to reject any or all bids if deemed to the interest of the County of Monmouth to do so.

By order of the Board of Chosen Freeholders of the County of Monmouth.
Joseph C. Irwin, Director
Irving S. Bennett, Clerk

Read the Official Proposal Column of
ENGINEERING NEWS-RECORD
This Week and Every Week

OFFICIAL PROPOSALS
(Continued from page 71)

Bids: June 20, 1961

Philadelphia, Penna.
Procurement Department
Water Department

Sealed bids will be received in Room 313, City Hall Annex, until 2.30 P.M., Daylight Saving Time, on Tuesday, June 20, 1961, and opened at that time for:
BID NO. 2770—WORK NO. W-1101—General Construction for the Belmont Filter Plant Rehabilitation Project, including Piping, Pre-treatment Structures and Equipment, Chemical Building Structures and Equipment, Structures for Additional Filters, Rehabilitation of Existing Filter and Administration Buildings, Conversion of Two Slow Sand Filters to a Filtered Water Reservoir, and Allied Work.
BID NO. 2771—WORK NO. W-1102—Filter Equipment, Piping and Automatic Controls for the Belmont Filter Plant Rehabilitation Project, including Wash Water Pumping Equipment.
BID NO. 2772—WORK NO. W-1103—Electrical System for Belmont Filter Plant Rehabilitation Project.
BID NO. 2773—WORK NO. W-1104—Heating and Ventilating System for the Belmont Filter Plant Rehabilitation Project.
BID NO. 2774—WORK NO. W-1105—Plumbing System for the Belmont Filter Plant Rehabilitation Project.
BID NO. 2775—WORK NO. W-1106—Elevated Steel Wash Water Tank of 150,000 Gallons Capacity, including Structural Steel Supporting Structure, Piping and Appurtenances, for the Belmont Filter Plant Rehabilitation Project.
Proposal forms, questionnaires and specifications may be obtained from the Water Department, in Room 1132, City Hall Annex, Juniper Street and Filbert Street, Philadelphia 7, Penna.
Upon payment of Deposit of $100.00 for Bid No. 2770, $20.00 for Bid No. 2771, $20.00 for Bid No. 2772, $25.00 for Bid No. 2773, $20.00 for Bid No. 2774, $5.00 for Bid No. 2775 or $150.00 for Complete Set covering all Six Bids. Blueprints may be obtained in Room 1132, City Hall Annex. The deposits will be refunded upon return of the Blueprints, unmarked and in an undamaged condition, within ten (10) days after bids are received.
No bids will be received unless bidder is qualified by the Procurement Commissioner. The questionnaire form with all questions fully answered must be filed with the Water Commissioner, Room 1113, City Hall Annex, at least one (1) week prior to the date of opening bids.
Each proposal must be accompanied by security in form and amount as set forth in the proposal form.

Bids: May 26, 1961

County of Suffolk, New York
Department of Public Works
Yaphank, New York

Separate sealed proposals, in duplicate, will be received until 11:00 AM prevailing time on May 26, 1961 by the Suffolk County Department of Public Works at its offices, Yaphank Avenue, Yaphank, Suffolk County, New York at which time they will be publicly opened and read for furnishing the following equipment:

CONTRACT #1—One 40 ft.—5000 Gal Oil Barge
CONTRACT #2—Two 65 Ft. Steel Scows
CONTRACT #3—One 40-45 Ft. Tugboat
CONTRACT #4—One 28 Ft. Steel Dredge Tender

Copies of Information For Bidders, Sample Forms of Contract and Bond, General Conditions of Contract, Outline Specifications, and Proposal Forms may be examined and obtained at the office of the Suffolk County Department of Public Works.
The Charge for a set of forms and specifications covering all contracts is $15.00 which amount will be refunded if they are returned in good condition within thirty (30) days of the award of the contracts or the rejection of proposals.
Each bidder must deposit with his proposal a certified check in an amount not less than five per centum (5%) of the gross sum bid in the proposal.
All equipment shall be delivered afloat at the Town Dock, Huntington Harbor, Huntington, New York.
The Department of Public Works reserves the right to reject any or all proposals.

H. F. Bishop
Commissioner of Public Works

EMPLOYMENT OPPORTUNITIES

BECHTEL

HYDRO

Engineers

San Francisco Assignment

Immediate openings for engineers with design of hydro electric projects, both preliminary and final phases.

Liberal relocation allowances for you and your family. Send resume to: Personnel Manager.

BECHTEL CORPORATION
220 Montgomery Street
San Francisco, Calif.

SALES ENGINEER

Excellent opportunity in Minnesota, North Dakota, South Dakota and Western Wisconsin sales territory, working out of Minneapolis District Office of major chemical corporation, for graduate engineer, age 25 to 32, desiring sales, promotion and construction work in expanding market. Highway and concrete engineering background desirable for contact with highway departments, contractors and concrete products companies.

Permanent position with excellent opportunity for advancement. Attractive salary, company car and expenses with liberal company sponsored benefits.

Contact Mr. T. D. Williams

PITTSBURGH PLATE GLASS COMPANY
Chemical Division
One Gateway Center
Pittsburgh 22, Pennsylvania

ASSISTANT CONSTRUCTION MANAGER

Career opportunity with nationally known engineer contractor corporation located in New York.
Experience in heavy industrial construction with a record of accomplishment in the promotion of construction services, subcontract negotiations and preparation of construction estimates and proposals for lump sum and cost plus projects essential.

All replies held in confidence. Write

P-6691, Engineering News-Record
Class. Adv. Div., P.O. Box 12, N.Y. 36, N.Y.

CITY PLANNERS

Positions available. Degree in planning preferred. Experience in Center City Studies desired. Salary open. Reply to: Personnel Director.

BUCHART-HORN
55 South Richland Ave. York, Pa.

Immediate Opening

TOP FIELD SUPERINTENDENT

For $10 million project involving complex shaft work. Must have substantial experience as superintendent on such similar type projects as underground missile bases with strong background in concrete. Strictly top field man required as project manager will handle other phases of job.

Specific project in South of approximately two years' duration with possibility of permanence of service with progressive company for the right man.

Send resume with salary requirement to:

Personnel Director
BLOUNT BROTHERS CONSTRUCTION COMPANY
P. O. Box 949
Montgomery, Alabama

OPPORTUNITY

SALES MANAGER, Age 35 to 43
Salary + Expenses + Bonus
Can Purchase Part Interest on Earnings.
LOCATION—Eastern New York State

Long Established Business. Distributorship Heavy Construction Machinery.
Tractors, Excavating Machinery, Aggregate, Asphalt and Concrete Processing Plants.
Preference experience in design and Estimating and selling aggregate, and Asphalt and Concrete Plants.
Eligible candidates reply immediately.
All information furnished to be held in strict confidence.

P-6538, Engineering News-Record
Class. Adv. Div., P. O. Box 12, N. Y. 36, N. Y.

Wanted

Thoroughly trained and experienced construction superintendent. Must provide evidence of capabilities in planning, organizing, and directing construction of asphaltic and Portland Cement concrete highways and city streets. Excellent salary, company car, with large southwestern paving company having large yearly volume. Position permanent if all qualifications met. If you are not experienced, do not apply. Maximum age limit 40. Mail experience, photograph and list qualified references to

P-6675, Engineering News-Record
645 N. Michigan Ave., Chicago 11, Ill.

ADDRESS BOX NO. REPLIES TO: Box No.
Classified Adv. Div. of this publication.
Send to office nearest you.
NEW YORK 36: P. O. Box 12
CHICAGO 11: 645 N. Michigan Ave.
SAN FRANCISCO 11: 255 California St.

• *POSITIONS VACANT*

Soils Engineer. Graduate Civil Engineer with field experience in foundation investigation, testing, and laboratory management. Will supervise field exploration and soils laboratory testing for highway construction. Required to analyze field information and test data to develop design criteria and recommend construction technique. Salary, to be negotiated depending on experience. Location, Intermountain West. P-6187, Engineering News-Record.

Structural Engineer-Midwest consulting firm seeks Ph.D. to design complex steel structures, reinforced and prestressed concrete. Preference will be given to applicants with practical experience. Permanent position with established firm in business since 1929. Moving expenses paid. Send resume, including education, experience, and personal qualifications to P-6245. Engineering News-Record.

Civil Engineer—Young, energetic, to work on construction jobs. Previous experience not necessary. P-6557, Engineering News-Record.

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Industrial Products Div.....40-41
Gunite Concrete & Construction Co..... 59

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Mack Trucks, Inc.....26-27
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Mayo Tunnel & Mine Equipment..... 68
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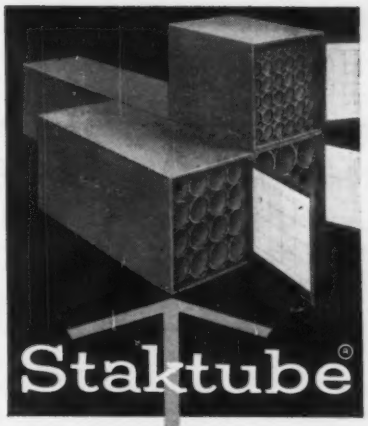

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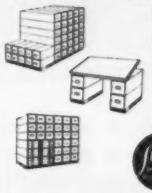

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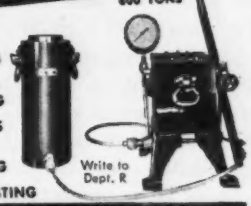

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Next Frontier: Stiffer Steel

HIGH-STRENGTH STEELS are being used in structural framing to cut costs, and even stronger steels are on the way. This is good news, and the researchers, the producers, the imaginative designers who have applied the new steels and the fabricators and erectors who have implemented the designs should be applauded. Their effective collective action raises hopes that the next frontier of development—stiffer, high-strength steels—will also be conquered.

The exciting story of how new high-strength structural steels are being used was told at a recent steel design and engineering seminar sponsored by U. S. Steel Corp. (ENR May 4, p. 22). And additional details are being given at the American Institute of Steel Construction's engineering conference being held in Minneapolis this week.

By using high-strength steel for the more highly stressed parts of structural members or frames and less-expensive carbon steel elsewhere, engineers have produced significant savings in both weight and cost. Examples cited at the seminar included an oil-storage tank, with high-strength steel for the bottom plates, carbon steel for the top; truss bridges, with three grades of steel; plate-girder bridges, with parts of flanges and web of high-strength steel; girders prestressed by welding high-strength flange plates to them during fabrication; hybrid beams, with high-strength steel flanges and carbon steel web; and multistory buildings, with lower-story columns of high-strength steel.

Accomplishments to date have been with steels with yield points up to 100,000 psi, three times that of ordinary steel. But, as was pointed out at the seminar, steels with yield points of 140,000 and 300,000 psi may soon be available. And the increase in price is not expected to be as large proportionately as the increase in yield point, thus making the newer steels economical.

However, steel researchers should not be—and some in fact are not—satisfied just to seek higher-strength material. There are still some barriers to widespread structural use of high-strength steel that can be removed only through development of steels with other properties improved as well.

Weldability and fatigue strength are two such properties. But perhaps the most important is the modulus of elasticity. This has a major effect on the lateral stability of long beams and columns and on the resistance of beams to deflection and vibration. Hence, an increased modulus would be beneficial to all grades of steel. But it would be particularly advantageous for high-strength material because of the reduced cross sections permitted with such steels.

Since high-strength steels now available have about the same modulus as carbon steel, it is natural to ask: Is it possible to produce steel with a substantially higher modulus? If so, can it be done without sacrificing other desirable properties?

A stiffer steel is as badly needed as stronger steel. Here is an opportunity for research to provide another breakthrough that will promote progress.

Of Critics and Cities

AMERICA'S SEVEREST URBAN CRITIC, philosopher-historian Lewis Mumford, charmed a packed audience at the American Institute of Architects convention with his violent and witty attack on urban renewal projects (ENR May 4, p. 20). But unlike many architectural critics, who denounce renewal projects in vague, esthetic jargon, Mr. Mumford tells you exactly where he stands.

He hates stereotyped high-rise apartment developments, large-scale commercial rebuilding like Pittsburgh's Golden Triangle and monumental culture centers like New York's Lincoln Center, now under construction. He charges that "nothing has done more harm to the genuine culture of the city than the large mass of urban renewal and public housing projects from New York to San Francisco." He wants renewal projects designed to "human scale," to promote the intimate social contacts characteristic of city life at its best.

Mr. Mumford's kind of freewheeling criticism serves a useful purpose by stimulating thinking on basic motives, which are sometimes forgotten in a preoccupation with intriguing methods. Nevertheless, criticism is not always the same thing as reasoning, and Mr. Mumford's has some unreasonable aspects.

The barren, stereotyped public housing projects that Mr. Mumford justly criticizes at least supply the tenants with indoor bathrooms, and afford them an opportunity for cleanliness totally barred in the slums that the housing replaced. And if, as charged, these projects do harm to the culture of the city, one can reply that culture isn't everything. Some of the European cities ravaged with plague during the Fourteenth Century had plenty of "culture."

Again, a Mumford warning against "mass solutions based on standardization and mechanical repetition" appears to be in opposition to modern construction technology. If so, it is as impractical as Gandhi's hope for India's salvation through the spinning wheel.

The architect's real task, which also concerns city planners, engineers and builders, is how to reconcile the economies of construction standardization with the diversity and design for the "human scale," that Mr. Mumford espouses. As more urban renewal is undertaken, this objective is the paramount one to keep in mind. And here Mr. Mumford offers what may be a useful directive: "Forget the damned motor cars, and design cities for friends and lovers."

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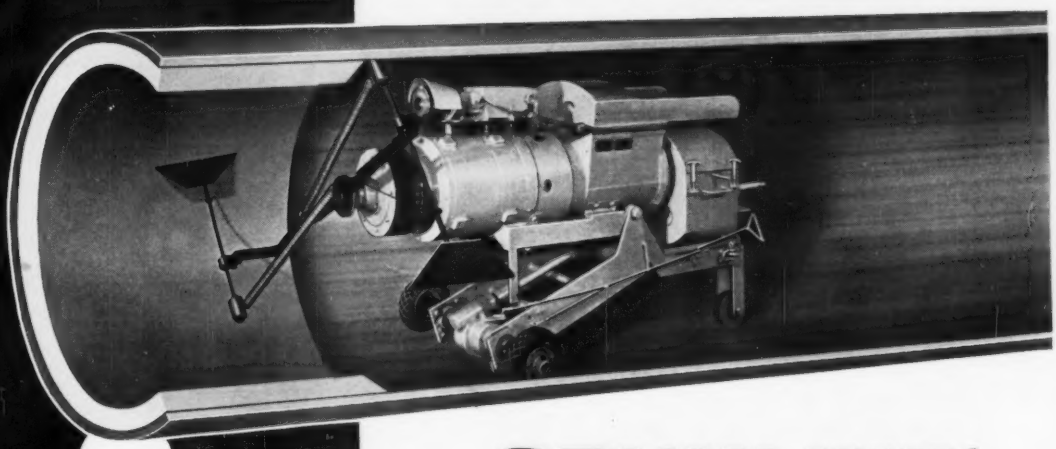

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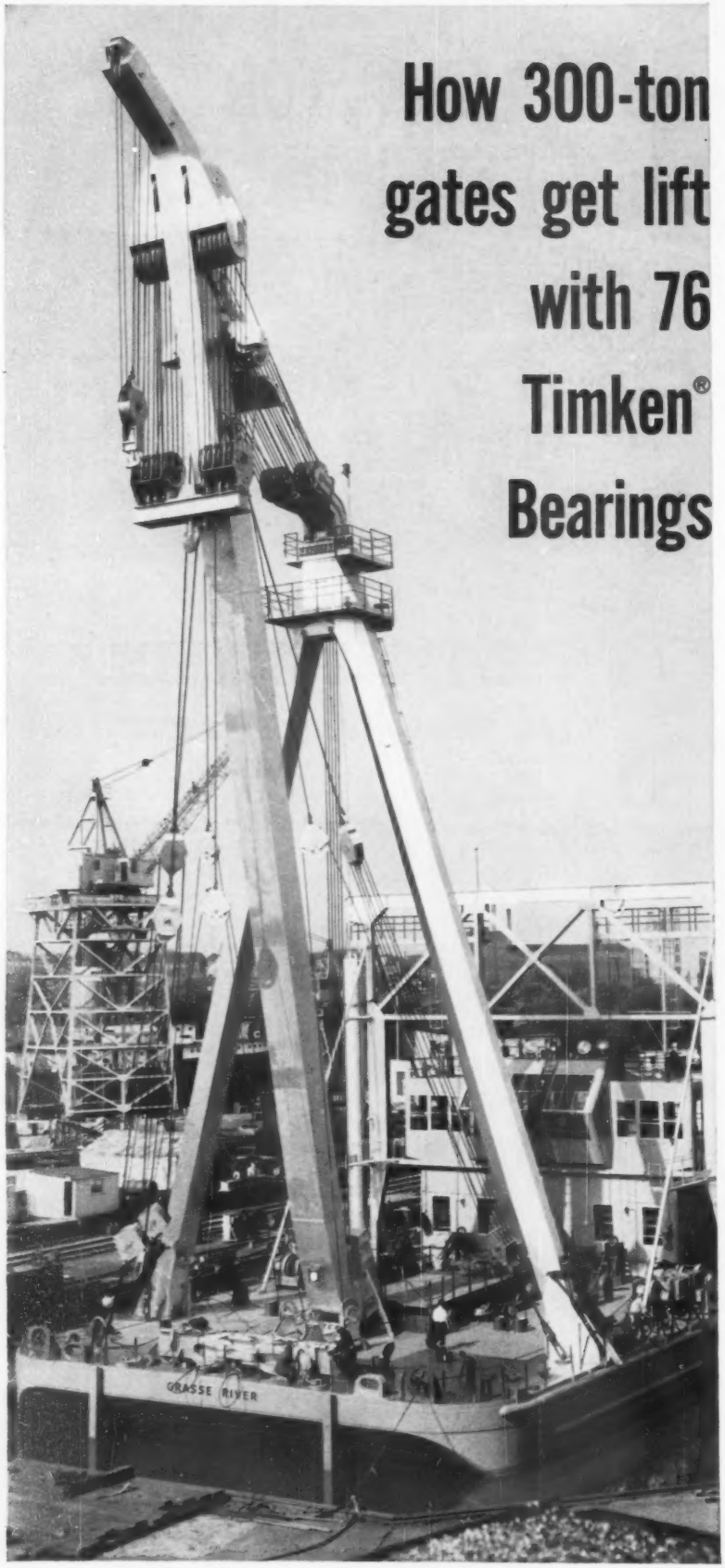

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